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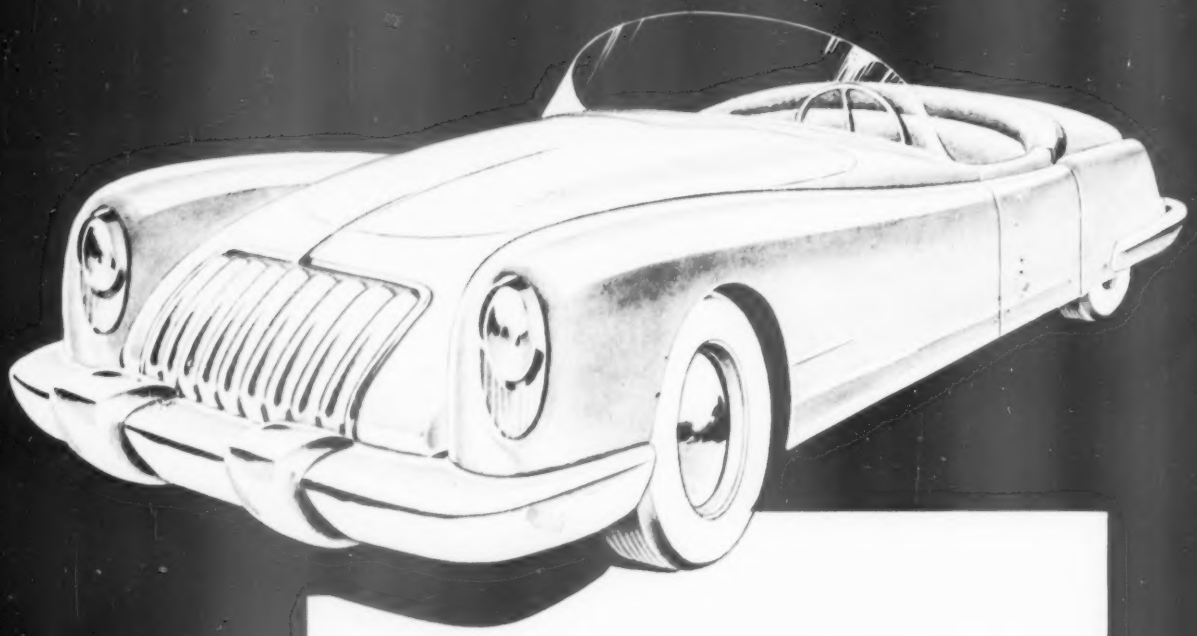

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the OIL AND GAS JOURNAL

OCTOBER 5, 1953 VOL. 52 NO. 22

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In Brief . . .

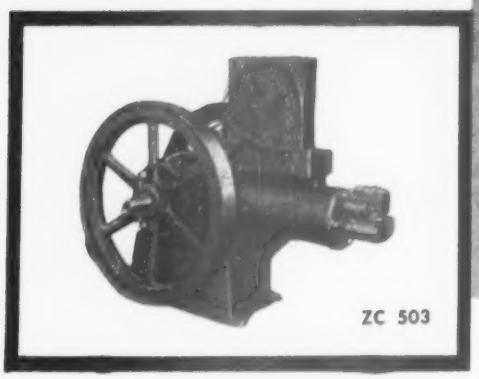
1. FIFTY CASE HISTORIES . . . These important case histories of Rocky Mountain drilling are taken from actual wells drilled within the confines of 11 basins and 2 uplifts. Presented in capsule form are facts for the drilling contractor — facts as to bore-hole, casing, and cementing program; distribution of rig time; penetration rates and bits; diamond coring; and the mud program. Here is a preliminary guide for drilling contractors when considering Rocky Mountain drilling. The intermontane basins of this region are now the scene of intensified exploration and development drilling. The drilling problems of the Rocky Mountain region differ from basin to basin and penetration differs from one formation to another. The analyses of the selected wells in this report help to point up these practical problems.

2. ESTIMATING PRODUCTION . . . A new oil-well evaluation nomograph is presented which may be used to determine the net income on a per well basis for an oil reservoir occurring at a depth of 15,000 ft. With a gradual trend toward deeper and deeper drilling, questions as to payout on deep wells are becoming increasingly important. Amount of productive oil sand and well spacing are two important variables which can be quickly estimated.

3. WORLD'S DEEPEST . . . How Ohio Oil Co.'s deep test in Paloma field, California, now the world's deepest well, was drilled is told here. Test was made to check Miocene possibilities and existence of Eocene or Oligocene sands. This Journal staff account covers rig description, upper and lower-hole drilling, deep coring, mud program, fishing jobs, and wire-line care.

4. FLUID HYDROFORMING . . . The design of Pan-Am Southern Refining Corp.'s Destrehan, La., fluid hydroformer is discussed. Main features covered are: (1) mechanical design of regenerator and reactor, (2) regenerator cooling and venting, (3) filter blowback system, (4) reactor feed distributor, (5) catalyst storage, and (6) slide valves.

5. PIPE-LINE CONTROL . . . How National Cooperative Refinery Association operates the remote-controlled booster stations on its product pipe-line is told by L. N. Young, superintendent of N.C.R.A. pipe lines. Step-by-step procedure in starting and operation is detailed.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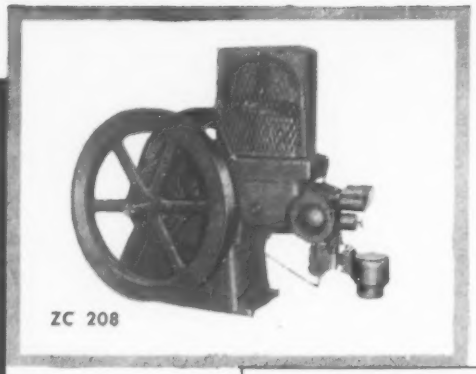
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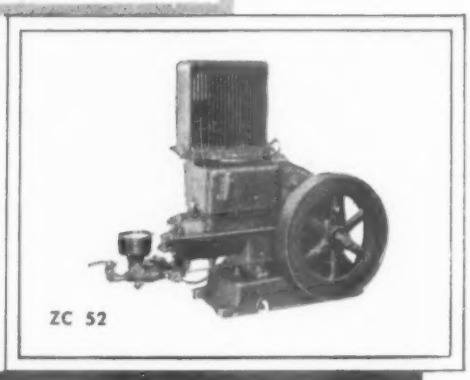
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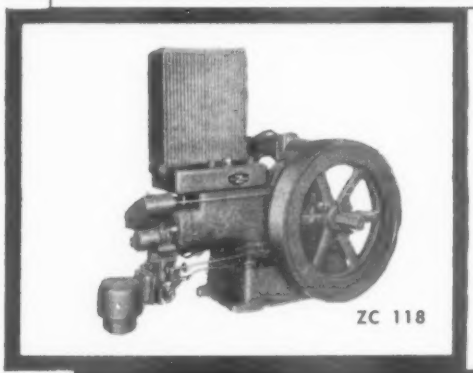
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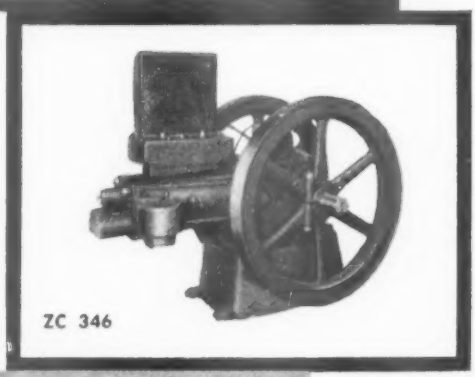
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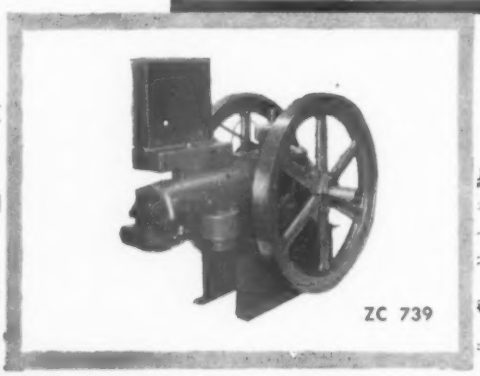
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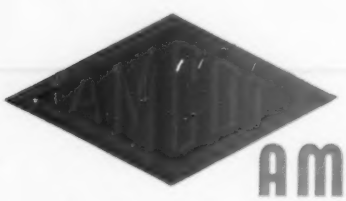

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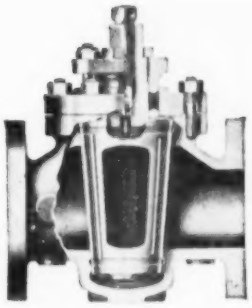
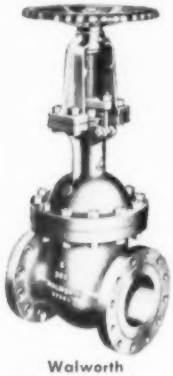


Walworth
Lubricated Plug Valve



Walworth
Steel Gate Valve

Walworth
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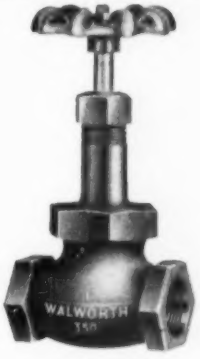

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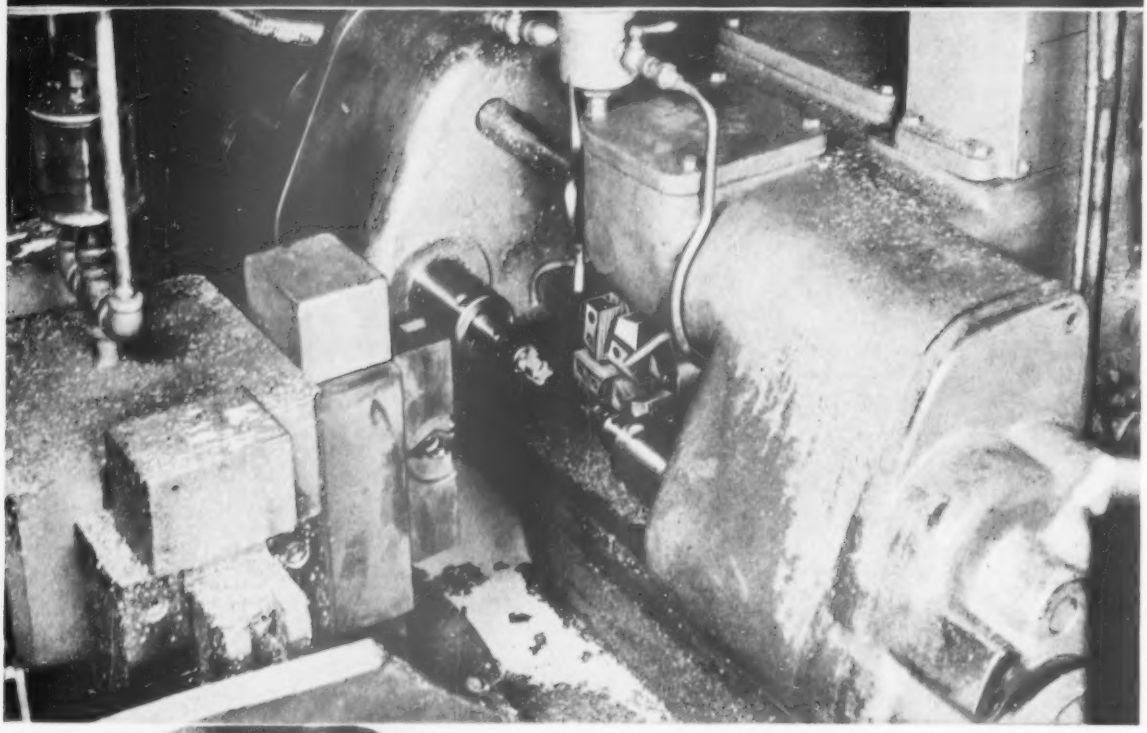

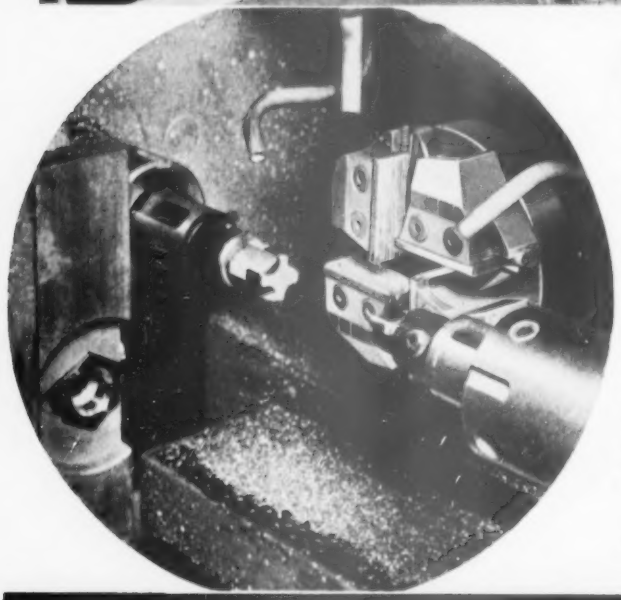

A *LANDIS* Solid Adjustable Die Head cut the cost of one threading operation in the plant of a large Middle Western manufacturer by 57%.

The operation, performed on a Goss and DeLeeuw Automatic Chucking Machine, required the cutting of a 1 11/16" diameter 14 pitch thread ½" long on cast brass valve bodies. Prescribed tolerances were easily maintained.

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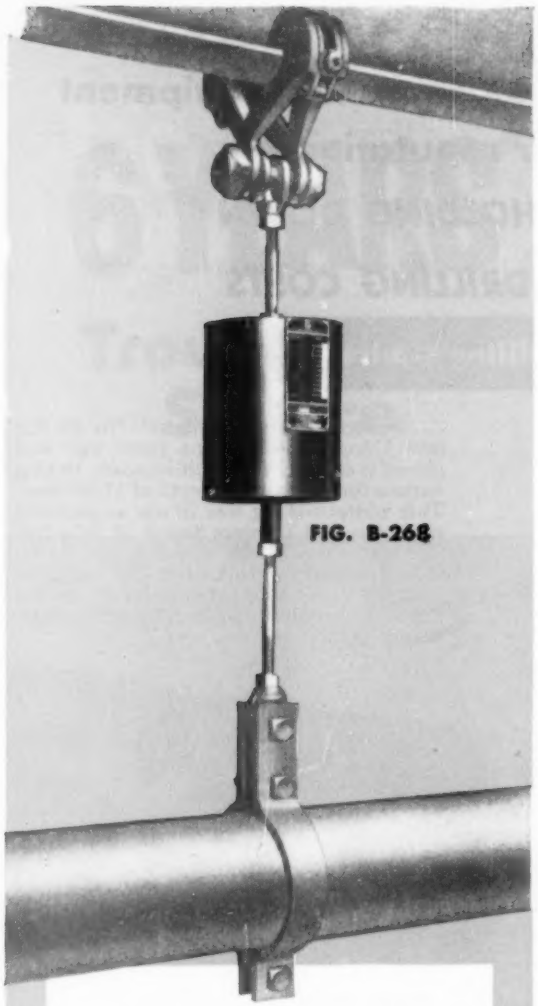

FIG. B-268

Pre-solve Pipe Suspension Problems...

with Grinnell Pre-engineered Spring Hangers

- Maximum variation in supporting force per ½" of deflection is 10½% of rated capacity — in all sizes.
- Precompression* assures operation of spring within its proper working range where variation in supporting force is at a minimum.
- Compact—minimum headroom made possible by precompression*.
- Guides prevent contact of coils with casing wall or hanger rod and assure continuous alignment and concentric loading of spring.
- All-steel welded construction meets pressure piping code.
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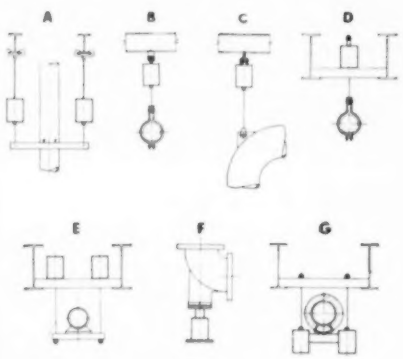
- Easy selection of proper sizes from simple capacity table.
- Installation is simplified by integral load scale and travel indicators.
- Unique swivel coupling provides adjustment and eliminates turnbuckle.

*Precompression is a patented feature.

TYPICAL APPLICATIONS

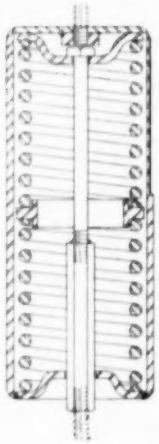


(A) Rod threaded to top cap (B) Furnished with single lug (C) Two lug style (D) Top adjusting (E) Adjustable top and bottom (F) For floor support (G) Trapeze assembly.

FOR LESS VARIATION IN SUPPORTING FORCE — FIG. 98

Fig. 98 is an adaptation of Grinnell's popular spring hanger, Fig. 268. It consists of two springs arranged in series within a single casing. A centering guide insures the permanent alignment of the spring assembly.

Fig. 98 has half the load deflection rate, and double the total working range of Fig. 268. Its 16 spring sizes accommodate loads from 74 lbs. to 9000 lbs. — but with a total working range *up to 5 inches!* Fig. 98 comes in the same seven types as shown for Fig. 268. Design details for identical types and sizes are the same for Fig. 98 and Fig. 268.



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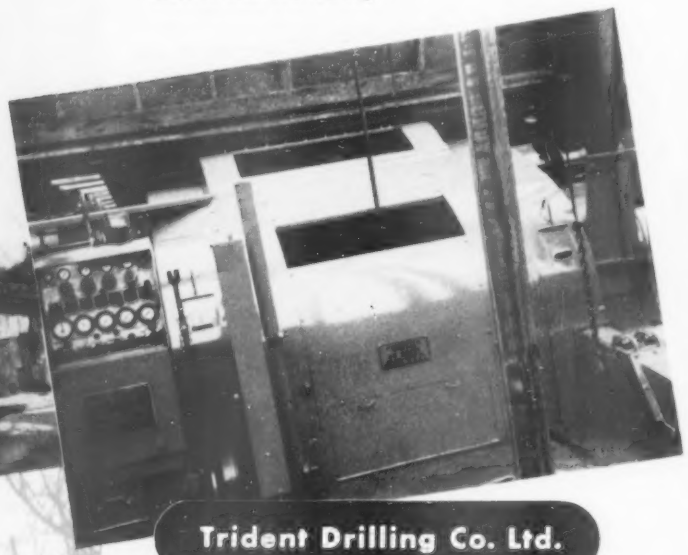

Trident Drilling Co. Ltd.

. . . put the next fully-equipped "Oilwell" No. 96 Rig to work in Canada early in September, 1952, and it was operated in the mountainous area near Jasper Park during the past winter as shown in the orange-colored photo made at Hudsons Bay-Richfield-Edson # 1. Mr. E. E. Moore, Trident's Vice-President, states: "Formation problems, climatic conditions and operations in general are severe in this area and afford a rugged test of drilling equipment. Our No. 96 has withstood the severe operations in good shape and we are entirely pleased with this rig."

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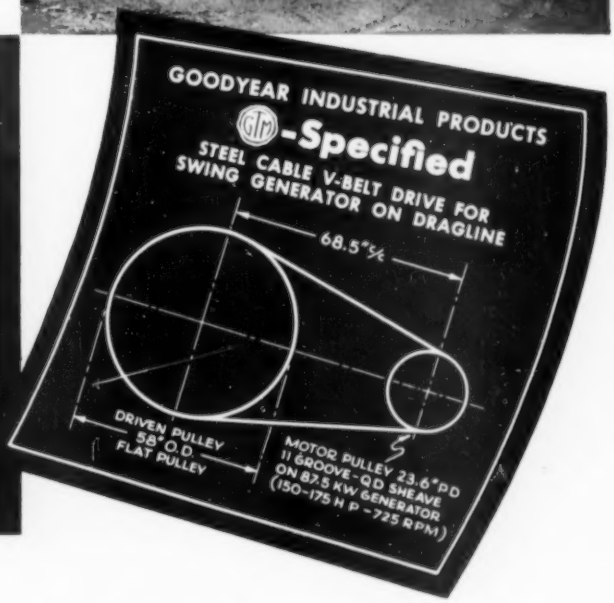
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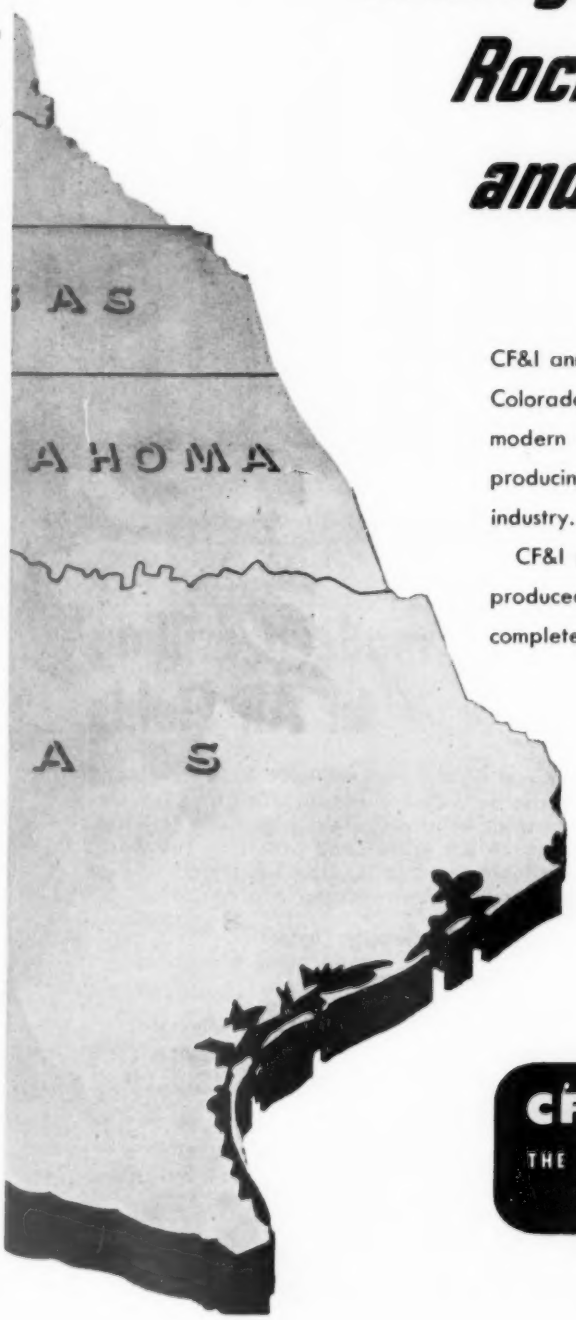

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SMALLER CLUTCHES EVEN FASTER!

For complete safety of the operator, split second disengagement is absolutely *essential!* The amazing disengagement speed of Wichita Air-Tube Clutches is due to minimum volume of air in tube and to Wichita Quick Release Valves.

Wichita Clutches are operating successfully, on many types of equipment, all over the world and *NOT ONE HAS BEEN REMOVED*. This alone proves the superior performance of Wichita Clutches. Test a Wichita . . . you'll see for yourself!

Other Major Features

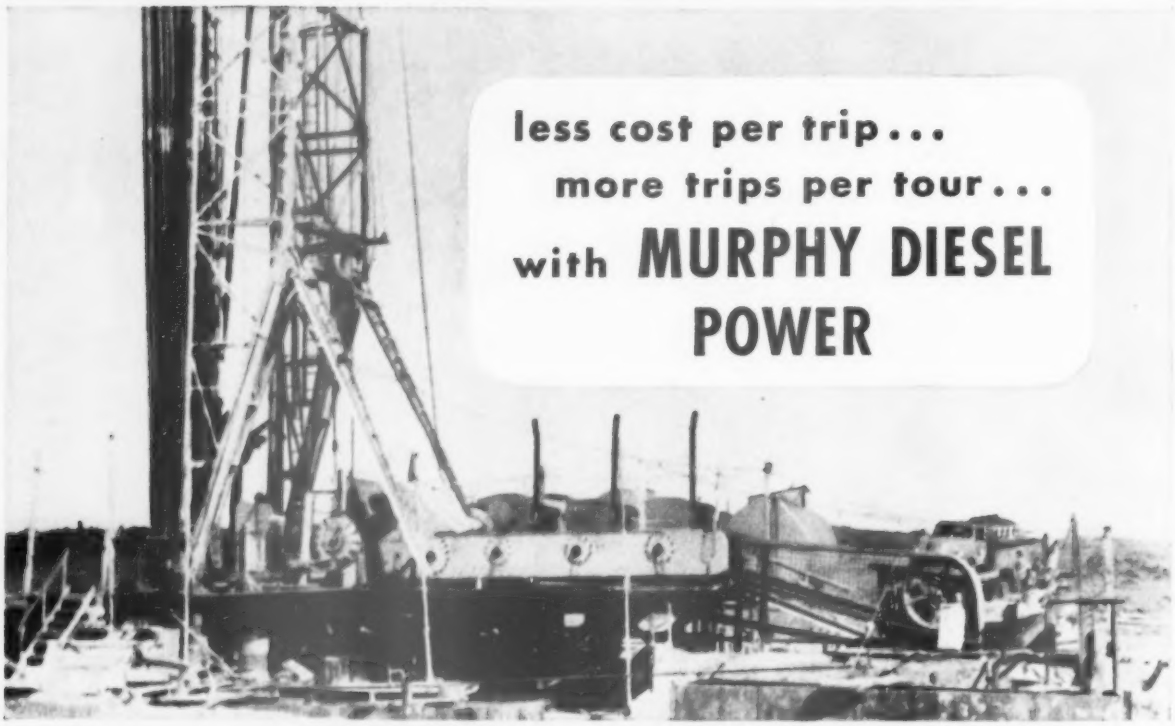
- Soft, Smooth Engagement
- Simple Design
- Efficiency Engineered
- Positively Ventilated for Cooler Operation
- Extremely Long Life
- Easier Maintenance

Consult your nearest Wichita Engineer for complete and detailed information.

WICHITA DISTRIBUTORS

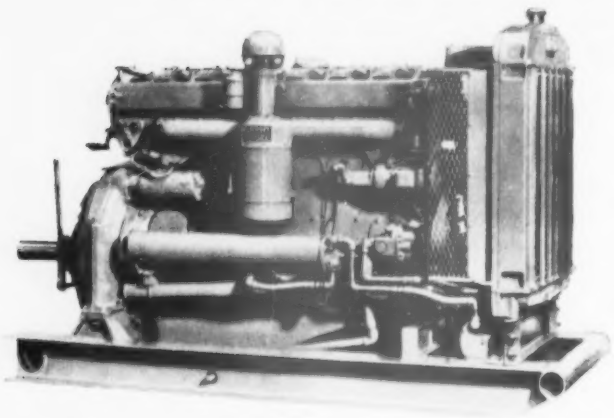
Brehm-Lahner, Inc., Detroit, Michigan
L. H. Fremont, Cincinnati, Ohio
W. G. Kerr Company, Pittsburgh, Pa.
Smith-Keser & Co., (Main Office) West Hartford, Conn.
Smith-Keser & Co., Philadelphia 44, Pa.
Smith-Keser & Co., New York, N. Y.
Frank W. Yarline Co., Chicago, Ill.
Power Rig & Equipment Co., Inc., Long Beach, Calif.
Robert R. King Co., Cleveland, Ohio

Ad 401



less cost per trip... more trips per tour... with MURPHY DIESEL POWER

Taylor Drilling Co. profits by these Murphy advantages in Montana oil field



Murphy Diesel engines and power units are made in sizes from 90 to 260 H. P.; dual fuel engines from 135 to 215 H. P.; generator sets from 60 to 140 K. W.

AT Lewiston, Montana, 3 Murphy Diesels rated at 190 continuous HP each, power a Model "O" Cardwell rig for Taylor Drilling Co. . . . another in the rapidly growing number of Murphy users in the oil fields who want heavy duty power at the lowest operating cost.

Fast starting, hot or cold . . . quick engine response to the throttle . . . plenty of power and longer life with minimum fuel consumption help make it straight-ahead drilling for successful operators like Taylor. This is a result of advanced engineering design features such as Murphy's Unit Injector system, "true" diesel operation, the hydraulic servo type governor and many others.

Get a complete rundown of these features and find out just what Murphy Diesel will do for you —ask your Murphy dealer for a copy of "10 Reasons Why Your Next Engine Should Be a Murphy" or write direct.

MURPHY DIESEL COMPANY
5305 W. Burnham St., Milwaukee 14, Wisconsin
FACTORY BRANCH: Sales, Parts and Service—113-116 S. Elwood St. Tulsa, Oklahoma

27c

MURPHY DIESEL

SEE YOUR MURPHY DIESEL DEALER, TODAY—

Albuquerque, New Mexico
Lively Equipment Company
Butte, Montana
Hall-Perry Machinery Co.
Corpus Christi, Texas
Houston Engine & Pump Company
Dallas, Texas
Conley-Lott-Nichols Machinery Co.
Denver, Colorado
Constructors Equipment Company
Edmonton, Alberta, Canada
Northern Engine & Equipment Co., Ltd.
San Antonio, Texas
J. E. Ingram Equipment Co.
Great Bend, Kansas
Manufacturers Dist. Co.
Great Falls, Montana
Hall-Perry Machinery Company
Houston, Texas
Houston Engine & Pump Co., Inc.
Jackson, Michigan
Utility & Industrial Supply Co.
Los Angeles, California
Industrial Engine Service
Lubbock, Texas
Conley-Lott-Nichols Machinery Co.
Glenn Rose Engine Service
502 South Real Road
Bakersfield, California

SALES, PARTS AND SERVICE, 113-117 S. ELWOOD STREET, TULSA, OKLAHOMA

Before you buy:

SEE 'EM IN ACTION!

TL & MK CONSTRUCTION CO. of Ft. Worth uses seven LS-85's in their pipeline work.

Rugged construction, work-speeding features help you keep pipelining on schedule, costs in line

More live weight—All-welded construction plus proper weight distribution provides extra strength without dead weight . . . resists impact and twist . . . simplifies field service.

WHY are more and more pipeliners specifying Link-Belt Speeders? Well, take the 30,000-lb. capacity LS-85 for example: It delivers 92 net hp at full load speed, has self-cleaning crawler treads, Independent Boom Hoist, not to mention outstanding stability. It's fast, maneuverable, yet takes rugged pipelining with a minimum of maintenance.

Like the LS-85, every Link-Belt Speeder combines quality construction throughout with advanced design to speed your work, give you more per equipment dollar.

If you'd like details on this complete line of crawler, truck or wheel-mounted shovel-cranes, ask your distributor or write for Catalog 2373.

LINK-BELT SPEEDER CORPORATION
Cedar Rapids, Iowa

13,053

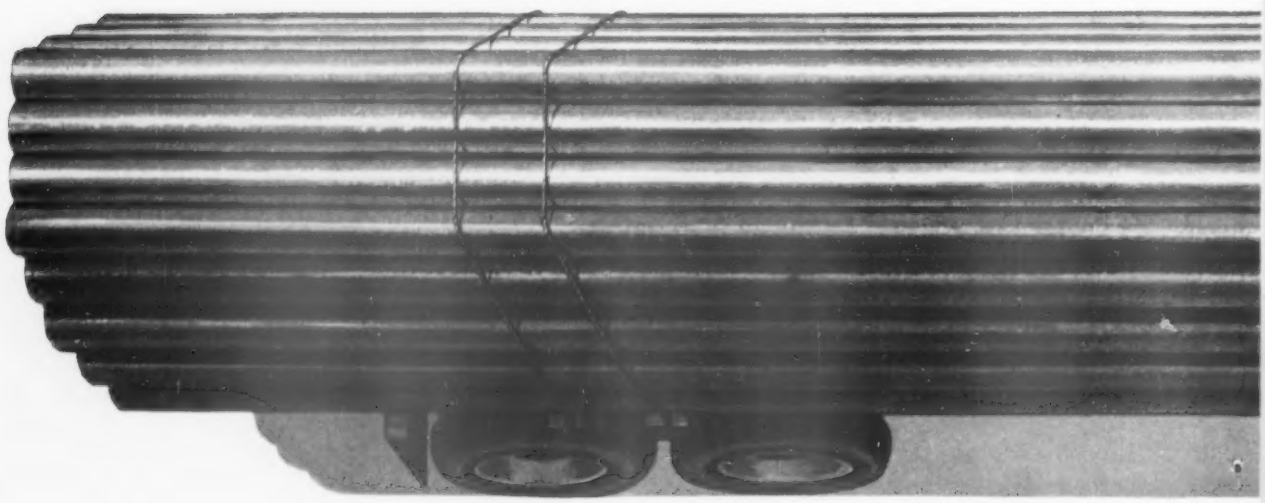
LINK-BELT SPEEDER CORPORATION

BUILDERS OF A COMPLETE LINE OF CRAWLER, TRUCK AND WHEEL-MOUNTED SHOVEL-CRANES

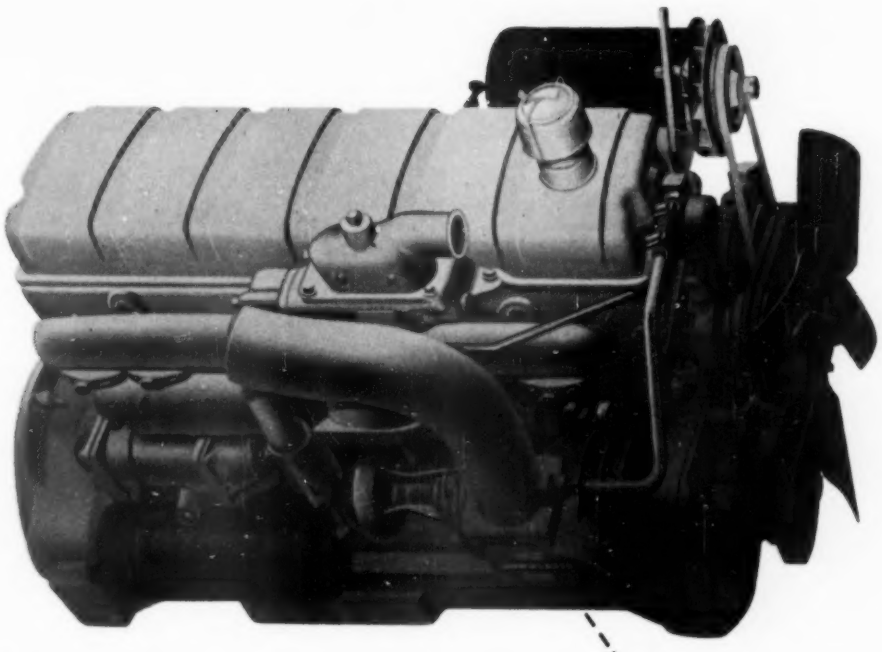
FACTORY-TRAINED DISTRIBUTOR SALES AND SERVICE SPECIALISTS ...EVERYWHERE

If you operate medium heavy-duty trucks ...

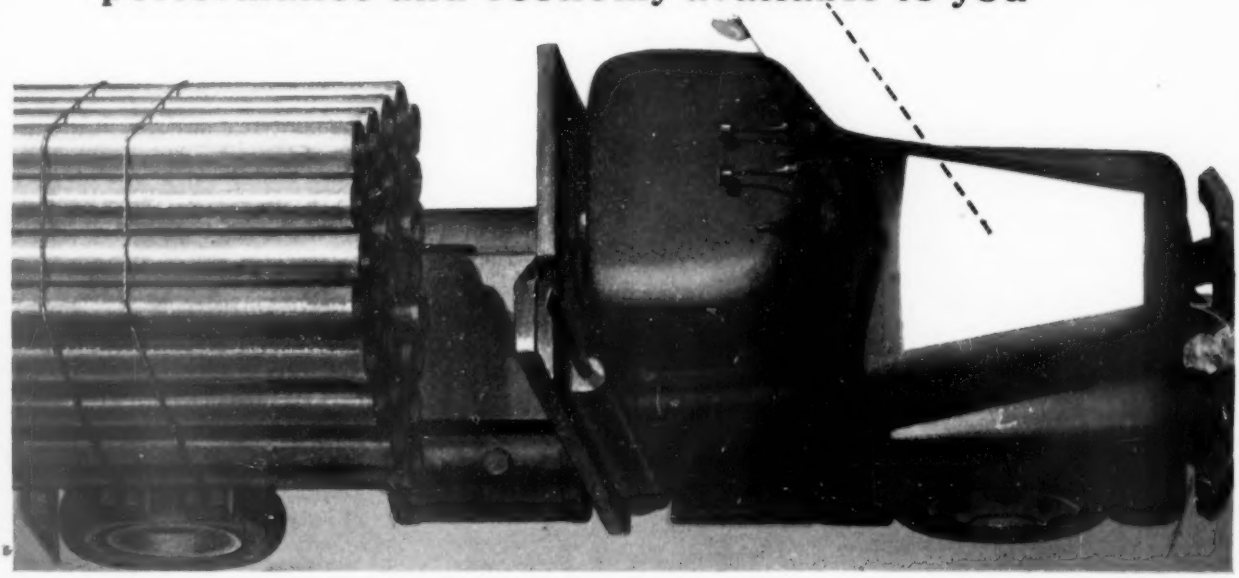
This new 150 h.p. diesel now makes Cummins



CUMMINS



performance and economy available to you



It's Cummins new Model JBS-600—ready to serve in the medium heavy-duty trucks produced by leading manufacturers. Ready to bring to this field the performance that has made Cummins the leader among high-output diesels. 150 h.p., the JBS-600 delivers full rated power for faster acceleration . . . for reserve stamina when the going is tough.

JBS-600 operators report more miles per gallon . . . lower fuel costs. This demonstrates the fact that Cummins' exclusive fuel and injection system—together with four-cycle operation and use of inexpensive Number 2 diesel fuel—naturally leads to savings on the job. The JBS-600 is ready to work profitably for you. It's Cummins-engineered for a long and useful life.

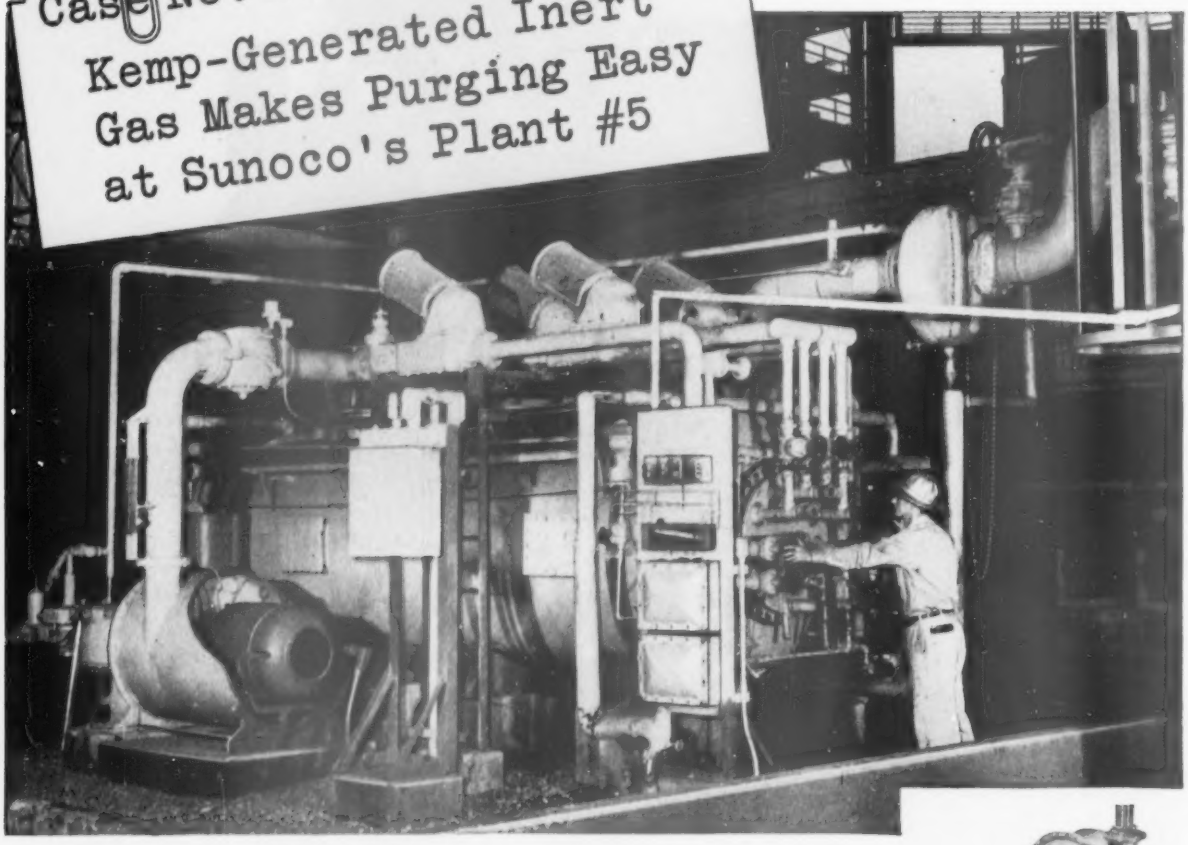
For all the facts—see your Cummins dealer!

Cummins® Engine Company, Inc. • Columbus, Indiana

Leaders in rugged, lightweight, high-speed diesel power

Case No. 57

Kemp-Generated Inert Gas Makes Purging Easy at Sunoco's Plant #5



How Sun Oil's "Magic Mill" at Toledo operates with 'round the clock safety

There's no *one* word that strikes terror in the hearts of oilmen everywhere more quickly than F-I-R-E! To combat this threat at the Sun Oil Co.'s giant refinery at Toledo, Ohio, constant vigilance, checks and inspections are the answer. And the liberal use of inert gas for purging pipelines, tanks and crackers is essential to this safety maintenance.

Kemp selected to do the job

When plans called for *doubling* plant production in 1950, a new Kemp Generator (see above) was installed to insure adequate inert gas production. Fast-starting, easy-to-operate, this Kemp unit more than filled the bill. Today tanks and lines are periodically purged for inspection and cleaning *as often as needed*. And thanks to its 60,000 cu. ft. per hr. Kemp Inert Gas Generator, Sunoco enjoys *exact analysis* inert production that meets all its purging requirements.

Let Kemp help you, too

If you have a purging or blanketing problem, why not let Kemp Engineers give you the same helpful advice used so profitably at Sun Oil's Toledo refinery. It costs you nothing to investigate. And it may save you money. Find out how Kemp's wide range of dependable, low-cost Generators (complete with the latest fire checks and safety devices) offer you the best way to solve your problems.

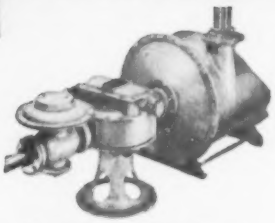
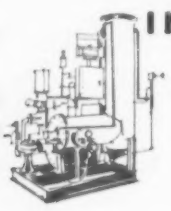


Photo above shows close-up view of Kemp Industrial Carburetor, the heart of every Kemp installation. Assures complete combustion... without waste, without tinkering. Reduces installation costs, simplifies maintenance.

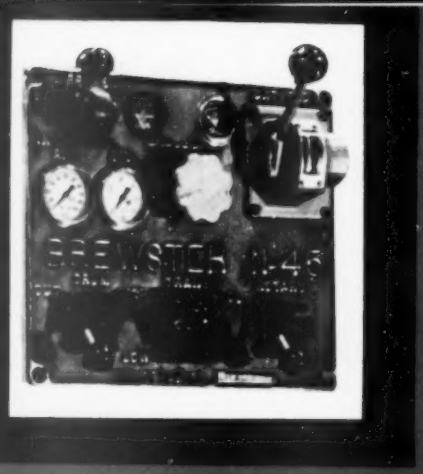
***For more complete facts and technical information, write for Bulletin I-10 to:* C. M. KEMP MFG. CO., 405 E. Oliver Street, Baltimore 2, Maryland.**

KEMP OF BALTIMORE



INERT GAS GENERATORS

CARBURETORS • BURNERS • FIRE CHECKS
METAL MELTING UNITS • ADSORPTIVE DRYERS • SINGEING EQUIPMENT

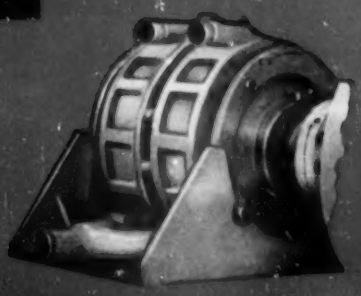


Simple, Responsive **CONTROLS**

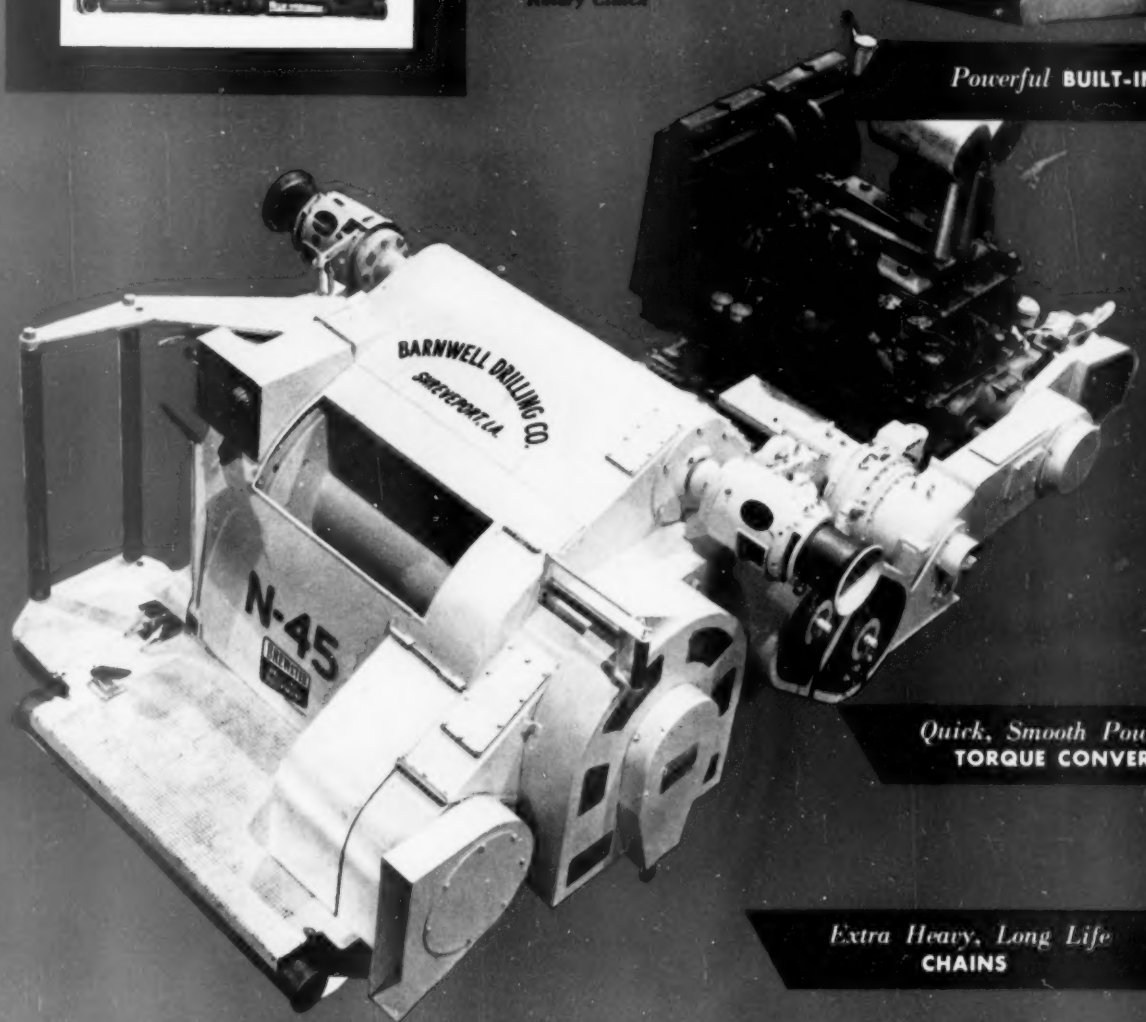
Transmission Brake
Torque Temperature
Torque Oil Pressure
Breakout Cathead

Air Gauge
Oil Gauge
Motor Throttle

Drum Clutch
High-Low Transmission Clutch
Rotary Clutch



Powerful **BUILT-IN BRAKE**

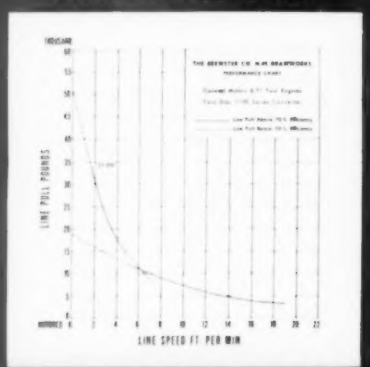


Quick, Smooth Power With
TORQUE CONVERTER

Extra Heavy, Long Life
CHAINS

BREWSTER RIGS ARE DEPENDABLE—RUGGEDLY BUILT—EASY TO OPERATE—EASY TO SERVICE

PERFORMANCE CHART



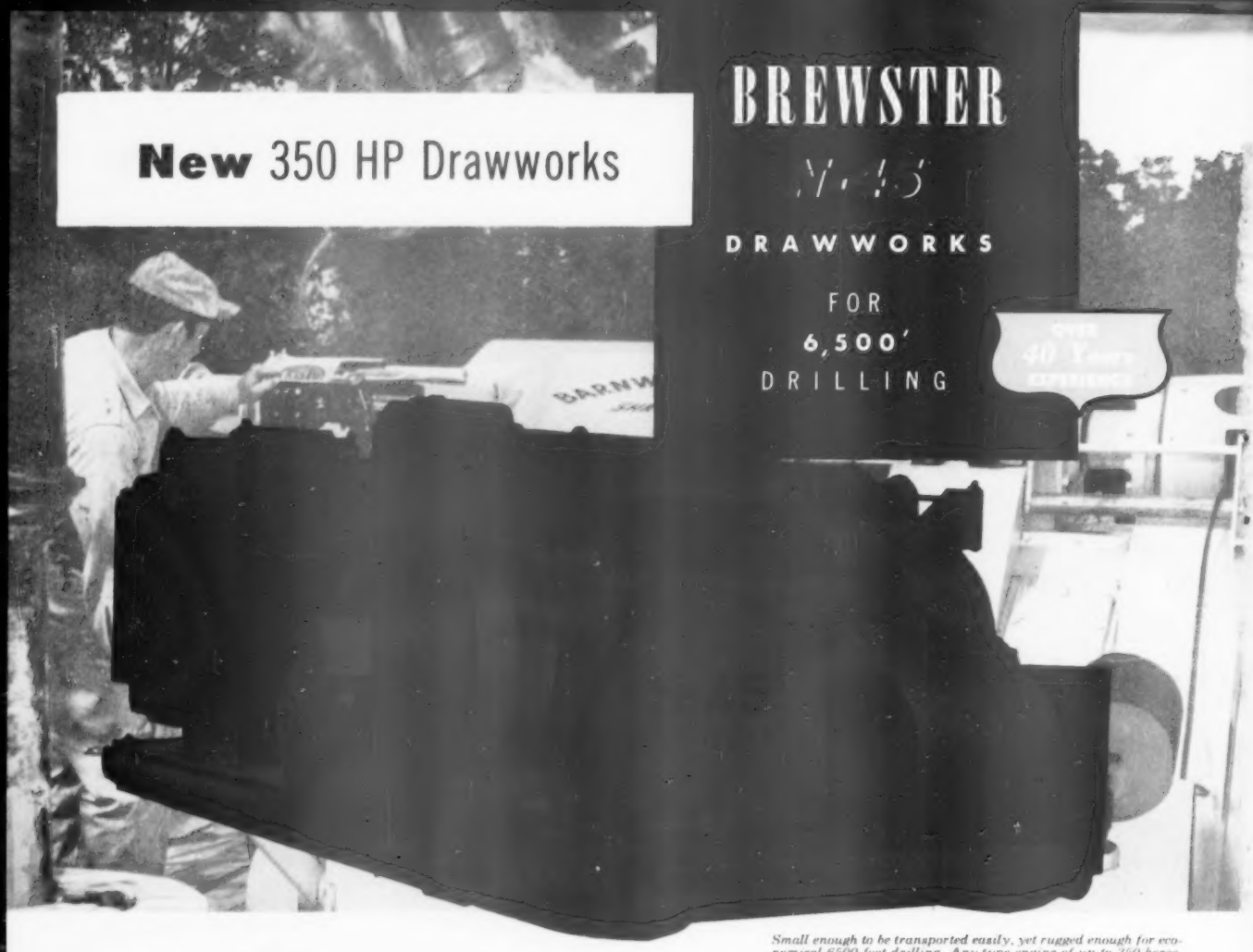
AUXILIARY EQUIPMENT

HT-100 hook block
4-SX swivel
*RSH-18 rotary.

THE **BREWSTER** COMPANY, INC., SHREVPORT, LOUISIANA

New 350 HP Drawworks

BREWSTER N-45 DRAWWORKS FOR 6,500' DRILLING



Small enough to be transported easily, yet rugged enough for economical 6500-foot drilling. Any type engine of up to 350 horsepower may be used by simply selecting proper engine sprocket

The compact N-45 torque converter drawworks, patterned after the proven design of other Brewster-engineered equipment, meets the need for a flexible rig suitable for 6500-foot drilling or deep well workovers. Brewster's experience and skill in manufacturing fine rotary drilling equipment have been combined to produce a rig that will keep down-time and drilling costs at the minimum. The N-45 is only eight feet wide to meet all highway transportation regulations.

Controls—All controls air operated and conveniently located at driller's position in a central control panel.

Drum—Drum core, 18 inches in diameter by 40 inches in length, built for long wire line life. Drum shaft 6 inches in diameter for extra strength.

Transmission—Chain type transmission has two forward speeds obtained by friction clutches and a reverse speed. Driller can shift from high to low without stopping load.

Brakes—Water cooled, full wrap, self-energizing brake is compounded for easy holding of heavy loads. Auxiliary 15 inch Double Hydromatic brake is built into drawworks housing.

Chains—Transmission and drum drive chains 1¾-inch pitch double high speed roller type in oil bath. Rotary drive countershaft has 1¾-inch pitch single chain. Hydromatic brake driven by 1¼-inch pitch triple chain from drum shaft with disconnecting clutch on drum shaft to eliminate chain running except when brake in use.

Clutches—All clutches air operated. Drum has auxiliary positive clutch for safety in case friction clutch fails.

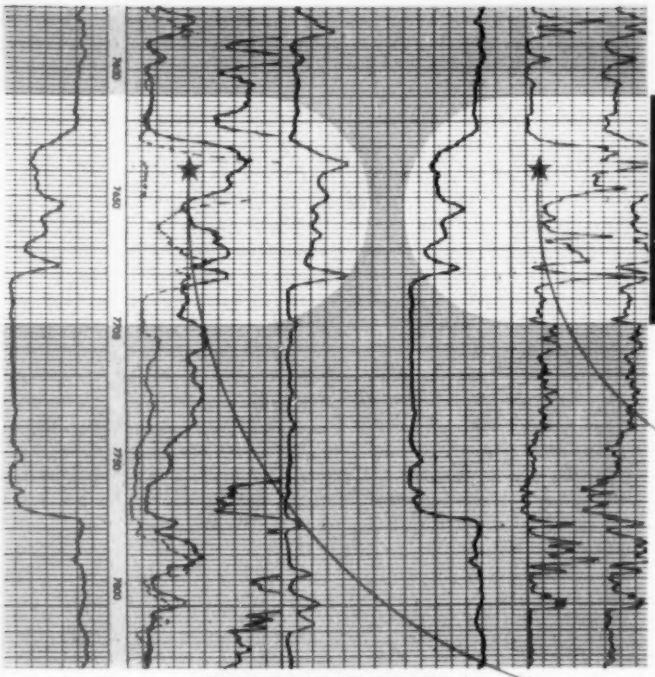
THE BREWSTER COMPANY, INC.

SHREVEPORT, LOUISIANA

BREWSTER DRILLING EQUIPMENT

ASK YOUR SUPPLY HOUSE TO TELL YOU ABOUT THE NEW N-45 DRAWWORKS

SUPPLY HOUSES - Apex Equipment Company • Murray Brooks, Inc. • Reams Supply Company • Bovaird Supply Company • Industrial Supply Company • In Canada: Rocky Mountain Supply Company – Direct and through recognized export dealers.



A COMPARISON ON THE SAME WELL

averaging effects are absent

GUARD ELECTRODE LOG

CONVENTIONAL ELECTRODE LOG

in HALLIBURTON'S *NEW* GUARD ELECTRODE LOGGING

Usual averaging effects of all conventional logs are absent in this outstanding Guard Electrode Log. This means the Log more accurately represents actual lithologic conditions... that core records agree more precisely with the Log, particularly in dense limestone or sandstone sections.

The measuring current of Guard Electrode takes the shape of a flat, thin disk and is *forced to flow* at right angles to the bore hole. This focused current eliminates shadow, lag, plateaus, and distortion anomalies found in conventional curves.

Resistivity measurements in beds of critical thickness or in pay zones under hard streaks or lignite beds now are possible with Halliburton's remarkable new electric logging tool.

Let this valuable tool aid you by providing more detailed lithology... more accurate resistivity measurements... on your next job. Phone your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN ELECTRICAL WELL SERVICES!

"WHY DON'T YOU TRY AETNA? YOU'LL BE SURPRISED AT THEIR VERSATILITY"

Yes, Aetna *is* versatile. For 37 years Aetna has been making original equipment bearings and precision parts for the nation's leading manufacturers in the automotive, farm implement and general industrial fields.

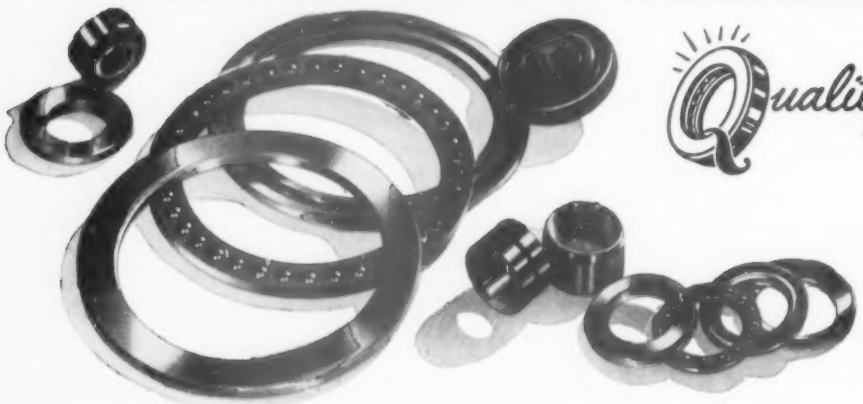
From conventional light duty thrust bearings in 1916, Aetna's versatility has grown to include all-type-all-duty ball thrust bearings, roller bearings and vital parts spanning an incredible range of industrial applications.

It's worth remembering—Aetna's diversified usefulness to industry—Aetna's reputation of producing to the stiffest tolerances known to the industry.

If you are having bearing or parts troubles—if you need a more versatile, more dependable supplier, consider Aetna. Your satisfaction is assured by the fact that 80% of our business comes from firms we have served for 20 or more of our 37 years. Write! Just state your problem, send your prints, or ask that a near-by representative drop in. No obligation. Aetna Ball and Roller Bearing Company, 4600 Schubert Avenue, Chicago 39, Illinois.

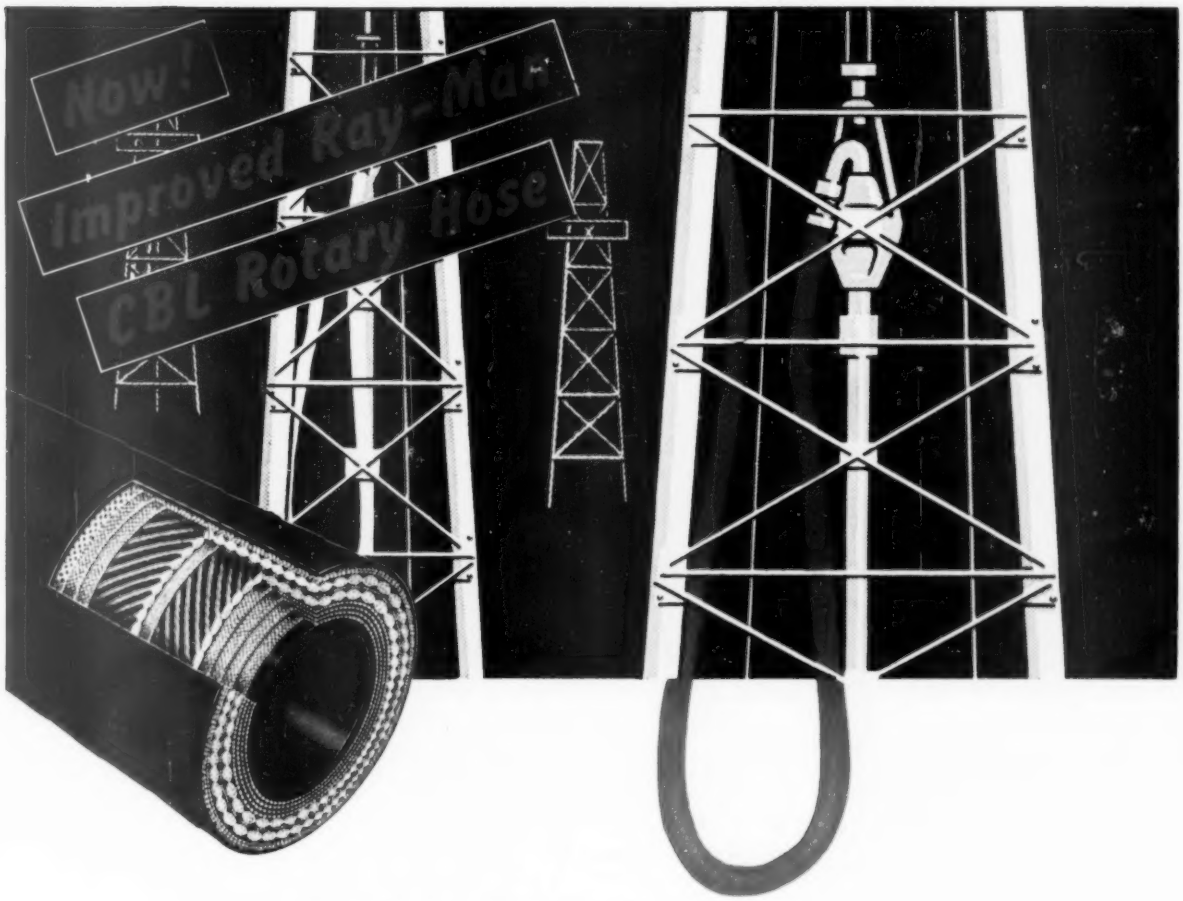
Aetna

BALL AND ROLLER BEARINGS • MISCELLANEOUS PRECISION PARTS



Quality since 1916

BRANCH OFFICES COAST-TO-COAST: • Albany • Atlanta • Auburn • Baltimore • Binghamton • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Denver • Detroit • Hartford • Houston • Jacksonville • Los Angeles • Newark • New York • Niagara Falls • Philadelphia • Pittsburgh • Providence • Richmond • Rochester • San Francisco • Seattle • Syracuse • Trenton • Utica • Waterbury • Worcester. *See your classified 'phone directory for addresses.*



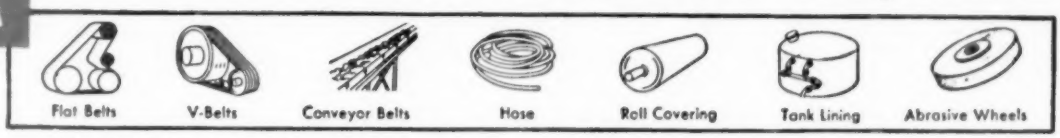
FOR LOWER RIG COSTS . . . Special cable wire reinforcement is one of the important improvements in Ray-Man CBL Rotary Hose that makes it still *more* flexible—with a higher factor of safety. The Ray-Man method of winding high tensile steel cable strength members under precisioned tension permits rotary hose flexibility never before equaled. The new Ray-Man resists kinking and, if accidentally crushed, will come back to full roundness under pressure. It is strong and blow-out proof. Built-in coupling features the "Lip-Lok" seal that tightens under high pressure. Ray-Man is easier than ever to make up in the rig and field tests prove it will give you MORE USE PER DOLLAR.

DISTRIBUTED BY NATIONAL SUPPLY COMPANY IN ALL PRINCIPAL OIL FIELDS

Write for Catalog 6903, describing Raybestos-Manhattan's full line for the oil industry; hose, V-belts, transmission belts, brake lining and packing.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls

MR 915

Do you have this MARVEL Inverse Oiler

on your { GASOLINE / BUTANE / or / DRY GAS } engine?

then you should use this MARVEL MYSTERY OIL in the Oiler!

Here's a carefully engineered pair to improve performance of any engine . . .

The *Marvel Inverse Oiler* is designed to feed *Marvel Mystery Oil* in exact proportion to engine speed and load. Prevents excess wear on valve stems and guides . . . keeps upper piston rings free to move in their grooves . . . retards ring flutter . . . and cushions ring pounding which can result in ring breakage. In addition, *Marvel Mystery Oil* reduces cylinder wall wear, and gives assurance against valves sticking. Remember, it is *the oil* which must do these things and only *Marvel Mystery Oil* is blended for this purpose and for this oiler. Over 30 years of exceptional performance.

This Chart shows the proper setting for constant load engines

BRAKE H. P. AT BELT	NAT. GAS CU. FT. PER HOUR	BUTANE GALLONS PER HOUR	GASOLINE GALLONS PER HOUR	M. M. OIL DROPS PER MIN.	M. M. OIL HOURS PER QUART
10	115.	1.07	1.12	4	228
15	172.5	1.60	1.68	6	152
20	230.	2.14	2.24	8	114
25	287.5	2.67	2.80	10	91
30	345.	3.21	3.36	12	76
35	402.5	3.74	3.92	14	65
40	460.	4.28	4.48	16	57
45	517.5	4.81	5.04	18	50
50	575.	5.35	5.60	20	45
60	690.	6.42	6.72	24	38
70	805.	7.49	7.84	28	32
80	920.	8.56	8.96	32	28
90	1035.	9.63	10.08	36	25
100	1150.	10.70	11.20	40	22
120	1380.	12.84	13.44	48	19
140	1610.	14.98	15.68	56	17
160	1840.	17.12	17.92	64	14
180	2070.	19.26	20.16	72	12
200	2300.	21.40	22.40	80	11
225	2587.5	24.00	25.20	90	10
250	2875.	26.75	28.00	100	9
275	3162.5	29.42	31.10	110	8
300	3450.	32.10	33.60	120	7

EXAMPLE:—If you use 805 cu. ft. of dry gas, 7.49 gallons of butane or 7.84 gallons of gasoline, your H.P. is about 70, so adjust oiler to feed 28 drops per minute. You will then receive about 32 hours per quart of MARVEL MYSTERY OIL.

If engine load increases after setting for normal load, oiler will automatically increase its feed, or decrease its feed when load is lessened.

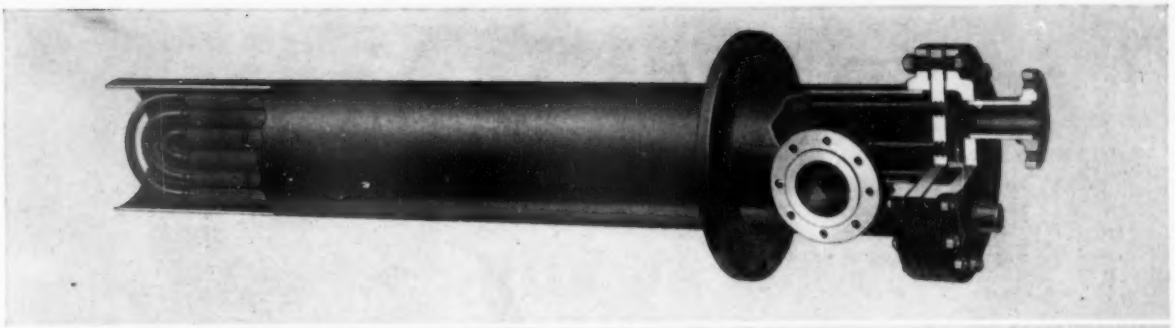
When more than one oiler is used

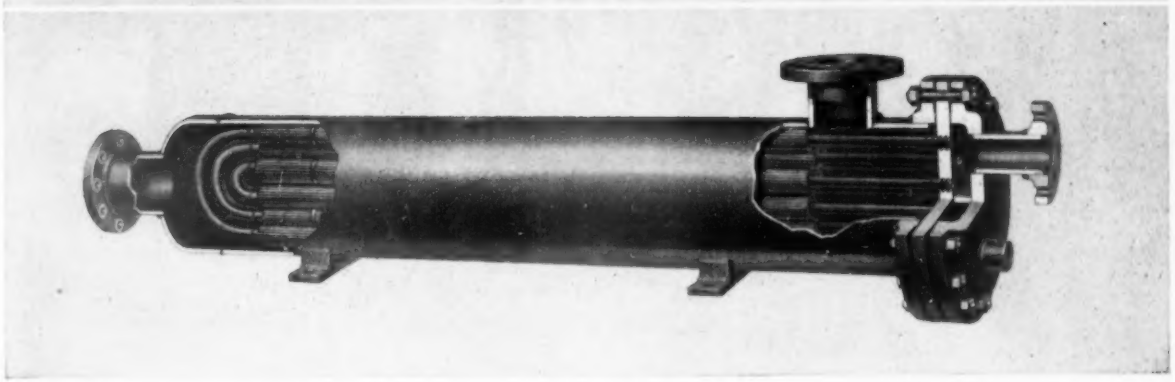
To determine drop count per oiler when more than one oiler is used on an engine—divide recommended drop count by number of oilers.

NOTE: Guarantee on oiler is void if any other oil than MARVEL MYSTERY OIL is used therein. Some *engines* also carry this guarantee policy.

See Your Local Jobber or Oil Well Supply House

EMEROL MFG. CO. Dept. 373, 242 West 69th Street, New York 23, N. Y.





BROWN FINTUBE

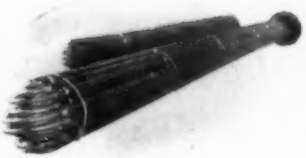
Tank Suction Heaters and Line Heaters

Offer Many Outstanding Advantages

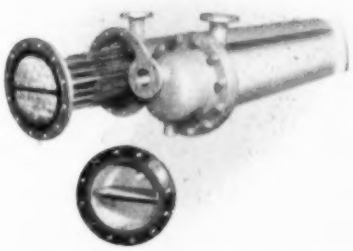
Brown welded fintubes provide much greater heating surface per foot of length than plain bare pipe or tubing. Consequently these heaters transfer more heat — at lower temperatures — assuring **faster, more efficient** heating without damaging the material or causing coking and build-up on the heating surface.

Metal bands placed around alternate fintubes in the bundle prevent the tubes from interlocking. This eliminates baffles and tube spacers that create back eddies and stagnant areas that encourage fouling;—and permits the fluid to travel through the longitudinal passages of the fintubes in close contact with the fins and center tubes — at low pressure drop.

Tank Suction Heaters that mount on a tank nozzle or the tank shell — also Line Heaters for pressure or suction service. Sizes 5″ to 24″ in diameter and 4′ to 24′ in length. Send for Bulletin No. 521. It gives full details.



Brown Fintube Hairpin Bundles Showing the Banding of Alternate Tubes that Eliminates Baffles and Assures Unobstructed Flow.

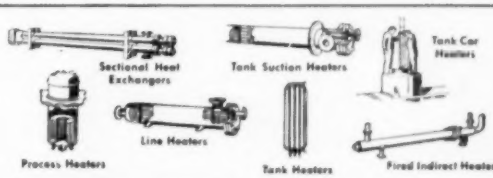


Hairpin Bundle Assembled in Shell Showing Mounting of Tube Sheet Between the Shell and Head.

BROWN FINTUBE

BROWN FINTUBE CO.

Elyria, Ohio



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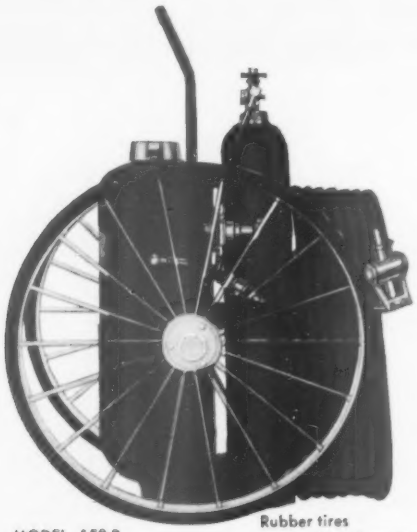
NEW

ANSUL WHEELED FIRE EXTINGUISHERS *provide*



MODEL 150-B

Rubber tires optional equipment

. . . GREATER FIRE-KILLING CAPACITY . . . HIGH-SPEED OPERATION and EASIER MANEUVERABILITY . . .

MODEL 350-B

Ansul "B" Model Wheeled Extinguishers are completely new. Dozens of design changes have improved their operating characteristics as well as their appearance. They provide faster, easier extinguishment of fires almost twice as large as those handled by our "A" model wheeled extinguishers. New Ansul Wheeled Extinguishers are easier to move to the fire. They can be actuated faster. They'll put out more fire faster. They're easier to recharge and maintain. And they will give even more years of trouble-free service.

For a demonstration call your Ansul representative today. Or for additional information send for file number *W-25*.

ANSUL *Chemical Company*

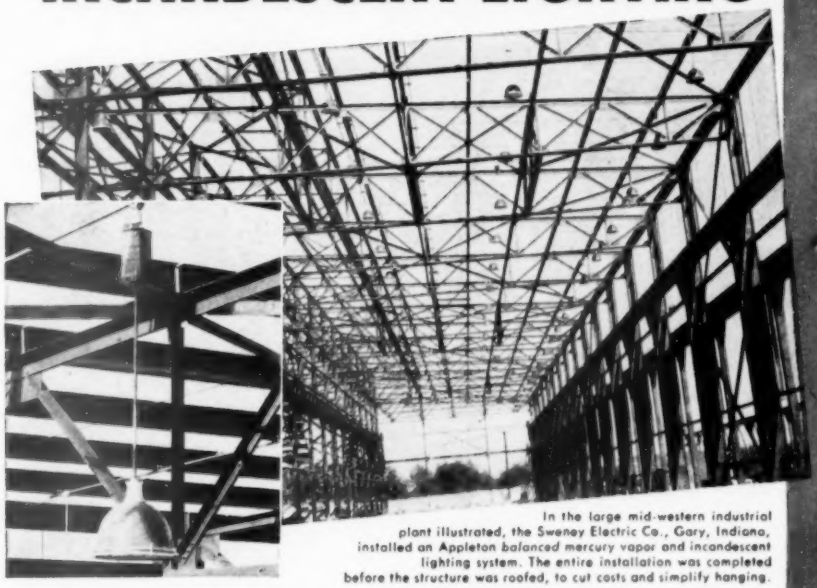
FIRE EQUIPMENT DIVISION • MARINETTE, WISCONSIN

MANUFACTURERS OF DRY CHEMICAL FIRE EXTINGUISHING EQUIPMENT, REFRIGERATION PRODUCTS, INDUSTRIAL AND FINE CHEMICALS AND LIQUEFIED GASES

APPLETON

balanced

MERCURY VAPOR and INCANDESCENT LIGHTING



In the large mid-western industrial plant illustrated, the Sweney Electric Co., Gary, Indiana, installed an Appleton *balanced* mercury vapor and incandescent lighting system. The entire installation was completed before the structure was roofed, to cut costs and simplify hanging.

Ideal for high-bay jobs. Two types are available, ball and cushion. Pendant suspension is from a Universal Joint which swivels 20 degrees in any direction and assures a plumb position at all times. The Cushion Type provides spring suspension and absorbs shocks and vibrations as used in above installation.

"Blended Light" to Meet Any Type of High-Bay Application!

No matter what the need, you can obtain the best in efficient lighting for constant good seeing conditions from Appleton! For high-bay installations, today's preference is APPLETON *Balanced* Mercury Vapor and Incandescent Lighting fixtures.

The Appleton line is most complete with a wide range of reflectors and fittings for Mercury Vapor Lamps and Incandescent Lamps in both porcelain enamel and processed aluminum. Reflectors are available with ventilated or non-ventilated necks . . . for interior or exterior use.

An important Appleton feature is the Appleton DISKONECT FIXTURE which simplifies and speeds up reflector and lamp removal. Both reflector and lamp are removed as a complete unit for easy cleaning without disturbing wires.

For full details . . . Write for Catalog No. 48

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY
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Also Manufacturers of:

Explosion-Proof Fixtures

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APPLETON ELECTRIC PRODUCTS REG. U.S. PAT. OFF.

"ST" Series Connectors

Outlet Boxes

How this hold-down anchor keeps its grip

Using packers for acidizing or other production techniques? Then take a good look at the Guiberson hold-down anchor. It has lots to offer.

The Guiberson hydraulic anchor acts as a positive means of holding tubing and packer down when the well is pressured below the packer.

How? The moment tubing pressure exceeds casing pressure, the anchor automatically grips the pipe. Each little case-hardened piston-slip independently holds fast against any thrust from above or below.

To make sure the vital anchoring power will be there when it's needed, the slips operate within Monel® inserts. That way, there's no danger the slips will "freeze" in the inserts as a result of rusting.

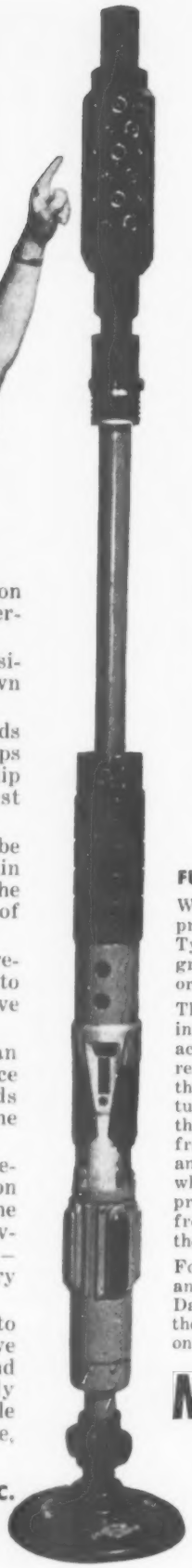
Monel combines its well-known corrosion resistance with strength and resistance to wear to protect your equipment against the destructive attacks of sour crudes, acid, brine and sand.

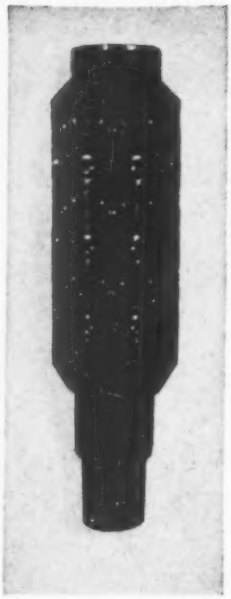
As has been proved time after time, you can always count on dependable, trouble-free service from "Monel-protected" equipment. It holds down corrosion—even in the most troublesome fields!

Right now, because so much is taken for defense, Monel and other Inco Nickel Alloys are on extended delivery. However, by ordering the equipment you want well in advance—and by giving NPA rating and full end-use information—you'll improve your chances of getting delivery when you need it.

And any time, of course, that you run into problems involving metals for oil field use, we hope you'll write us. Inco's Technical Service and Corrosion Engineering Section may already have the answer handy. If not, they may be able to help you find it. Either way, there's no charge, no obligation.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.





FULLY AUTOMATIC

When tubing pressure exceeds casing pressure, the slips of this Guiberson-Type "H1" hydraulic hold-down anchor grip the pipe and hold against upward or downward thrust.

The slips are case-hardened, and operate in Monel inserts, thus assuring positive action together with maximum corrosion resistance. Among the principal uses for the "H1" are: (1) Holding packer and tubing down while well is pressured below the packer, as in acidizing or formation-fracture processes; (2) Anchoring tubing and packer in gas or water injection wells where tubing pressure will exceed casing pressure; and (3) Preventing tubing from "breathing" in pumping wells where the fluid level is low in the casing.

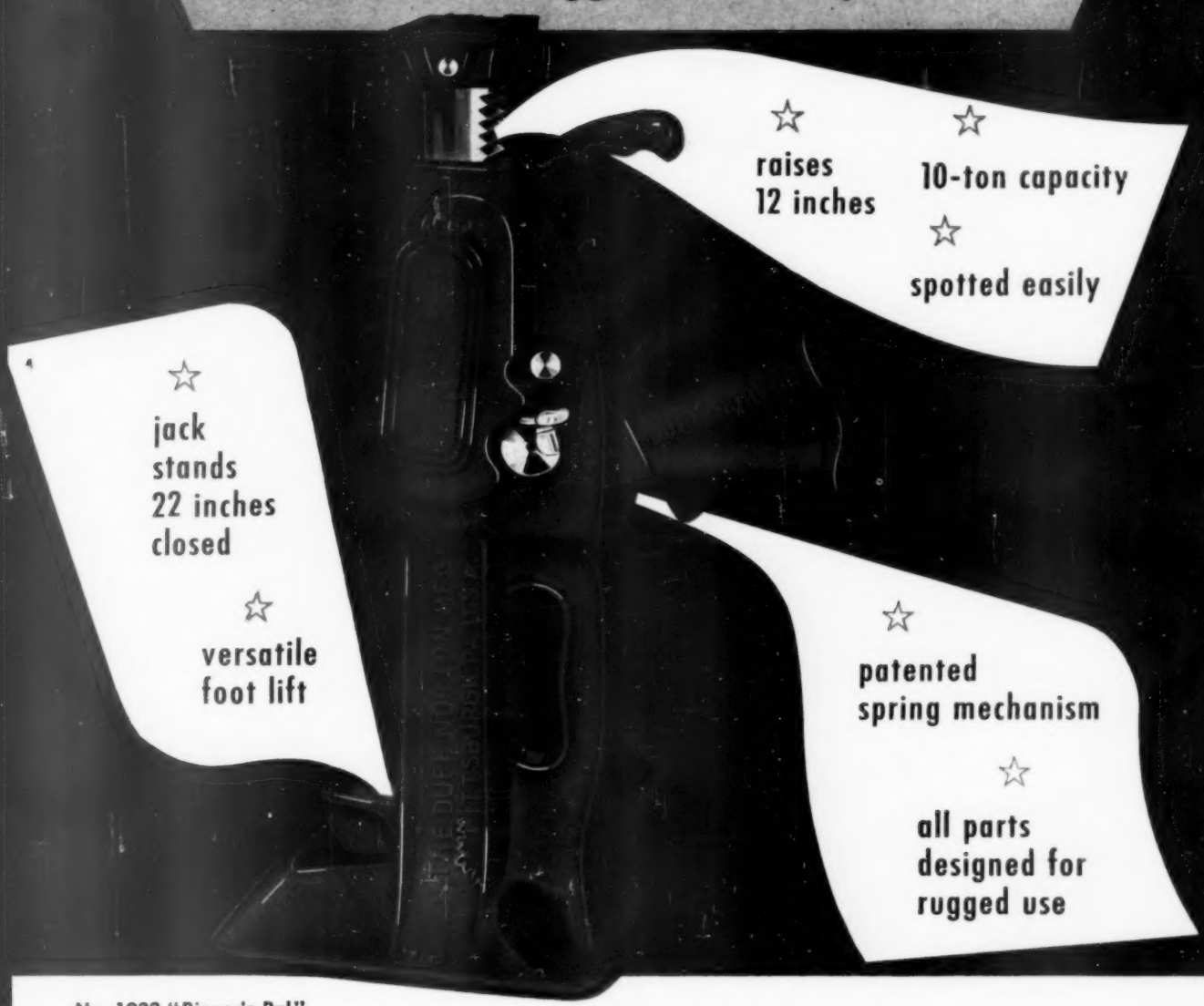
For more detailed information about this anchor, write The Guiberson Corporation, Dallas, Texas, through whose courtesy the illustrations and technical information on this page were supplied.

Monel

. . . your partner in progress

INCO

Read why the light-weight 1022 Jack is called the "Rigger's Pal" by oil men



No. 1022 "Rigger's Pal"

For erecting drilling rigs and lifting and lowering heavy equipment of all kinds, the Duff-Norton 1022 "Rigger's Pal" Ratchet Lowering Jack is your best bet. Here's why oil men call it the "Rigger's Pal":

- Spotted easily, it can be operated by one man.
- It uses its foot as well as its head. Versatile foot lift starts raise 2¼ inches above base.
- Like all Duff-Norton jacks, the 1022 has the patented, adjustable, spring mechanism assuring absolutely safe, trouble-free service. The spring's tension is easily adjusted with a screwdriver without removing any part of the jack.
- Without straining any part of the jack, it moves 10 tons.
- When closed it is only 22 inches high, yet has a raise of 12 inches.
- It is specially designed for rugged outdoor use.

Get the complete story on the 1022 and other famous Duff-Norton Jacks for oil men. Inquire at your oil field supply store or write the world's oldest and largest manufacturer of lifting jacks. Ask for Oil Field Jack Bulletin AD 19-B, The Duff-Norton Manufacturing Co., P.O. Box 1889, Pittsburgh 30, Pa. Canadian plant —Toronto 6, Ontario.

DUFF-NORTON *Jacks*

"Giving Industry A Lift Since 1883"

A Tulsa Winch for your job insures efficiency and low-cost operation. Available in 28 different models, in capacities from 6,000 to 80,000 pounds, there is a Tulsa Winch to meet every winching requirement.

For detailed information and prices, contact your nearest Tulsa Winch distributor or write direct to—

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THE WORLD'S LARGEST MANUFACTURER OF TRUCK POWER WINCHES

USEFUL CHECK LIST for DRILLING CONTRACTORS

Most of the wells you drill are near a J&L store, which makes this check list highly useful information. Avoid delays. Speed up your operations. Check these examples of what any near-by J&L store offers . . .

- J&L new SpringKore Wire Rope for rotary drilling
- J&L new PlastiKore Wire Rope for cable tool drilling
- J&L A.P.I. Seamless Drill Pipe, Casing and Tubing
- J&L Seamless Integral Joint Drill Pipe of Blue Ribbon Heat Treated Alloy Steel
- Wheland Slush Pumps — Rotaries — Swivels — Drawworks etc.
- Republic Rubber — Rotary, Suction and Vibrator Hose
- Century Electric Company — Motors and Generators
- St. Louis Cordage Mills — Manila Drilling Cables — Bull Ropes — Cat Lines — Cordage
- Lee C. Moore Corp. — Drilling Masts
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- Wilson Manufacturing Co., Inc. — Drilling Rigs and Servicing Units
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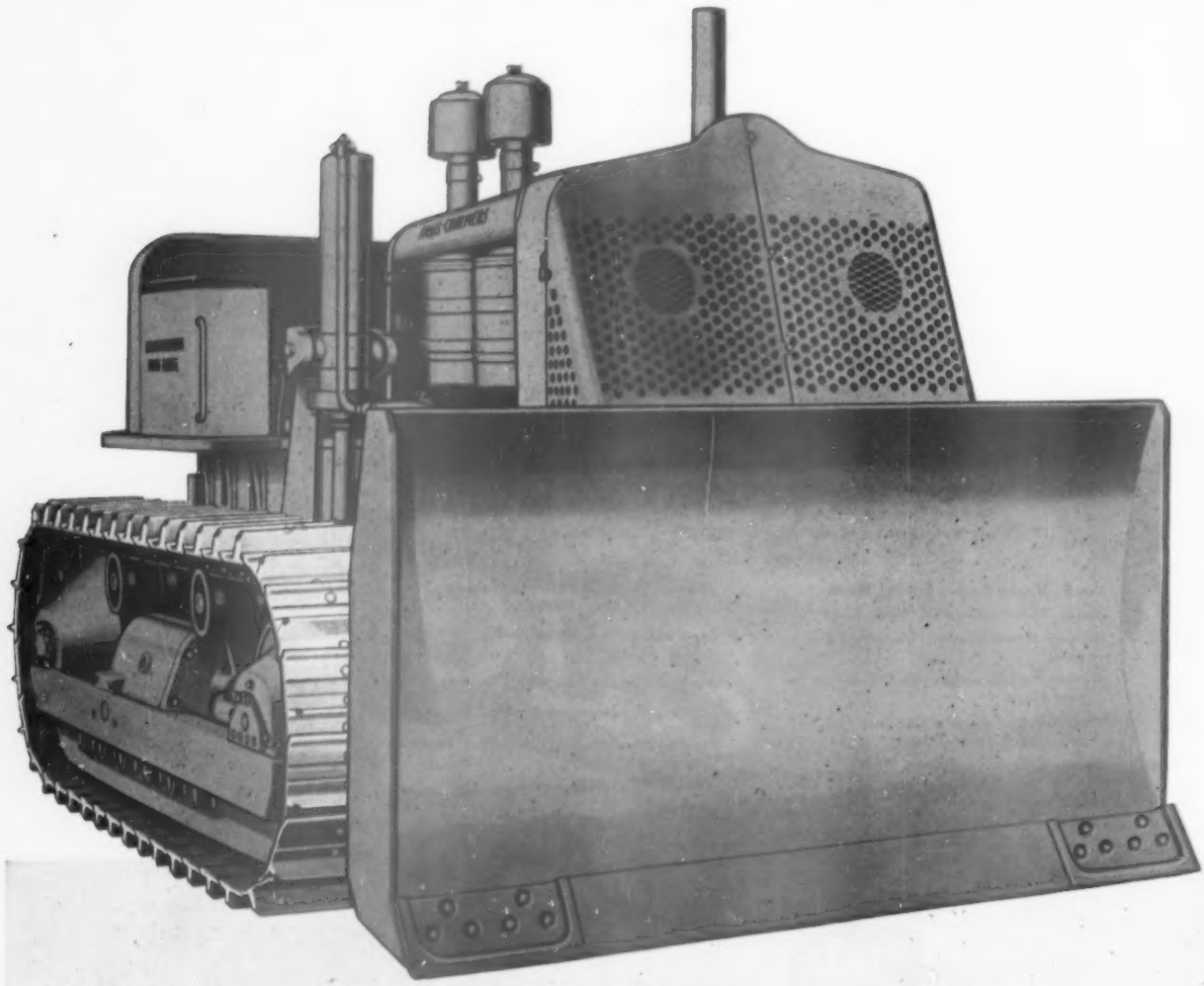
87 STORES • 19 OFFICES • 8 RESIDENT SALESMEN

P·E·S·A

A Check List

in considering your next oil field Dozer Tractor



Allis-Chalmers HD-15 equipped with new 15X frame-mounted dozer. More powerful, more rugged—but still highway width. No special permit needed. Here's a yards-ahead slush pit digger.

In addition to the 15X, the HD-15 is available with standard width cable or hydraulic dozers—straight or angle blade—sideboom and 3 cu. yd. Tractor Shovel.

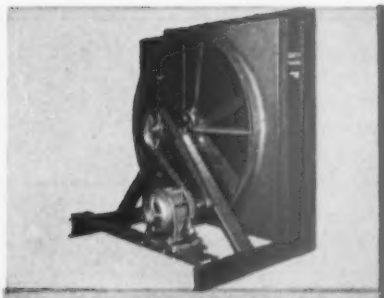
Features Oil Field users demand from Dozer Tractors	HOW THE ALLIS-CHALMERS HD-15 CRAWLER ANSWERS THESE DEMANDS	
MORE POWER	The HD-15's 102 drawbar hp. gives you that extra reserve for moving drill rigs, towing trucks, dozing bigger dirt loads.	✓
LUGABILITY (bigger loads)	Hangs on to temporary overloads with minimum of shifting. When tough going pulls travel speed down 40 percent, tractor increases drawbar pull almost 20 percent over rated pull.	✓
BETTER TRACTION	3,853 square inches of track on the ground takes the 27,850-lb. HD-15 over rough or mucky terrain. Stabilizer keeps tracks in line for full stability.	✓
MANEUVERABILITY	Hydraulic steering, easy-operating engine clutch, self-energizing brakes give operator positive, finger-tip control of the HD-15. Transmission design permits going from any forward to any reverse speed with one simple shift of the gear lever. Actually increases production up to 25 percent on short runs.	✓
OPERATOR COMFORT	Wide arm rests, adjustable cushioned seat, easy-to-reach levers and pedals help operator keep production up through the entire shift.	✓
BETTER VISIBILITY	High seat, tapered hood and narrowed cowl give HD-15 operators "ringside" vision. Fuel tank design allows full rear view of drawbar and winch operations.	✓
EASY MAINTENANCE	Truck wheels, idlers and support rollers have Positive Seals with 1,000-hour lubrication periods. Lubrication time saved gives you added productive hours.	✓
SIMPLIFIED SERVICING	Maintenance crews welcome HD-15 unit construction advantages. Each major assembly—transmission, final drive, clutch, engine, steering clutch or truck frame—can be dismantled without removing related assemblies.	✓
VERSATILITY	Clearing land, building and grading access roads, building fire walls, skidding rigs, digging slush pits, winching, pipe handling and backfilling—any oil field operation moves faster, easier with a powerful HD-15 on the job.	✓
QUICK TRANSPORT	Lighter weight, 8-ft. highway width blade permits 24-hour-a-day transport at a moment's notice—no transport permit needed.	✓

Let us prove it! We say the HD-15 takes on the toughest oil field jobs. Why not ask your Allis-Chalmers dealer for a demonstration and see for yourself? Do it now.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Use Them Individually or in Combination...

YOUNG HEAT TRANSFER PRODUCTS
Are ALL Engineered to Work Together

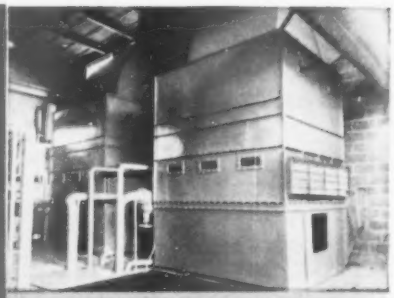


"Mono-Weld" Jacket Water Coolers

Rugged, welded-steel construction assures maximum strength with minimum weight for stationary or semi-portable equipment. Core sections readily replaceable. Tanks easily removed for cleaning.

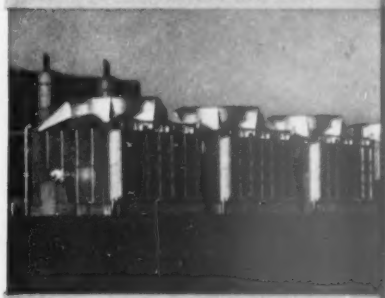
"Full-Flow" Jacket Water Coolers

Sturdy, welded-steel frame with specially-designed Young "Full-Flow" cast tanks. Flexible mountings absorb vibration, allow for expansion and contraction. Tanks easily removed for cleaning.



Evaporative Cooling and Condensing Units

Self-contained units in six basic models, with single or two-coil assemblies. Sectional design provides versatility, ease of handling. Used primarily for cooling Diesel engine jacket water and lube oil.

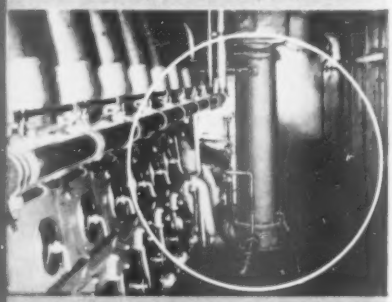


"VAD" Cooling and Condensing Units

Vertical air discharge permits compact multiple unit installations without loss of efficiency due to cross winds. Low-level mounting, low-cost installation, easy inspection and maintenance are features.

"HC" Cooling and Condensing Units

Horizontal core construction with vertical air discharge. Rugged structural design; wide choice of cores; complete with fans, power plants and controls. In single or multiple type units.



Shell and Tube Heat Exchangers

Available in 690 standard models, single to four-pass, fixed and removable tube bundles. Unusually close-tolerance construction assures maximum cooling with minimum weight. Calculator available.

YOUNG RADIATOR COMPANY

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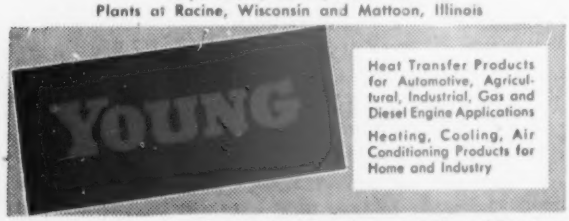
Plants at Racine, Wisconsin and Mattoon, Illinois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Heat Transfer Products for Automotive, Agricultural, Industrial, Gas and Diesel Engine Applications
Heating, Cooling, Air Conditioning Products for Home and Industry

Leaders in Heat Transfer Engineering for more than 25 years

For a full picture of the complete Young Line of heat transfer equipment, write for a free copy of General Catalog No. 148. For more detailed information on any of the products shown above, please state which products interest you most, and a complete catalog will be sent without obligation.

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Other Representatives in Principal Cities

Close Inspection

This cat picture makes us think of the final inspection of Midwest Welding Fittings. It is equally intense, searching, eye-on-the-ball type. Such final inspection is only one of an exhaustive series of continuous controls and checks that play an important part in assuring the high quality and uniformity of all Midwest Welding Fittings. You can cut your welded piping costs by specifying Midwest Welding Fittings.

A corner of the Final Inspection Department where every Midwest fitting is individually checked for concentricity, uniformity, and dimensional accuracy. Such checks are the last of a series conducted during production.

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MIDWEST WELDING FITTINGS

6104

Scottie McBlock Ponders — Pertinent Points to Perceive for Purchasing . . . A BETTER TRAVELING BLOCK.

Has it a positive grease seal protecting each bearing?

McKISSICK HAS!
Johns-Manville Klipper Seals on all traveling blocks.

Has it a center or divider plate between each sheave minimizing center pin deflection?

McKISSICK HAS!
center plates support pins between each sheave . . . to distribute load more evenly and stop deflection.

Has it necessary weight and balance for FAST TRUE falls?

McKISSICK HAS!
heavy steel plate construction throughout . . . no need to add ballast for extra weight.

Is it readily adaptable to popular hooks?

McKISSICK IS!
illustrated are combinations of McKissick blocks with Byron-Jackson and Webb Wilson hooks.

COMBINATIONS ARE EASILY SEPARABLE TOO!

McKISSICK

McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

we serve the aircraft industry, too

Spicer's 50-year record of service to the automotive industry is well known. But do you know that our long experience and highly developed skill are also helping to produce the world's fastest, highest-flying bomber?

We are manufacturing gears of almost unbelievable standards of quality and precision, for use in the new six-jet Boeing B-47 engines. These $2,000,000 planes travel at 600 miles per hour, and can drop a full load of bombs from an altitude of 7½ miles anywhere in the world.

On the earth as in the sky, Spicer helps man move faster, better, more efficiently.

Designing, Developing, Engineering, Manufacturing and Service

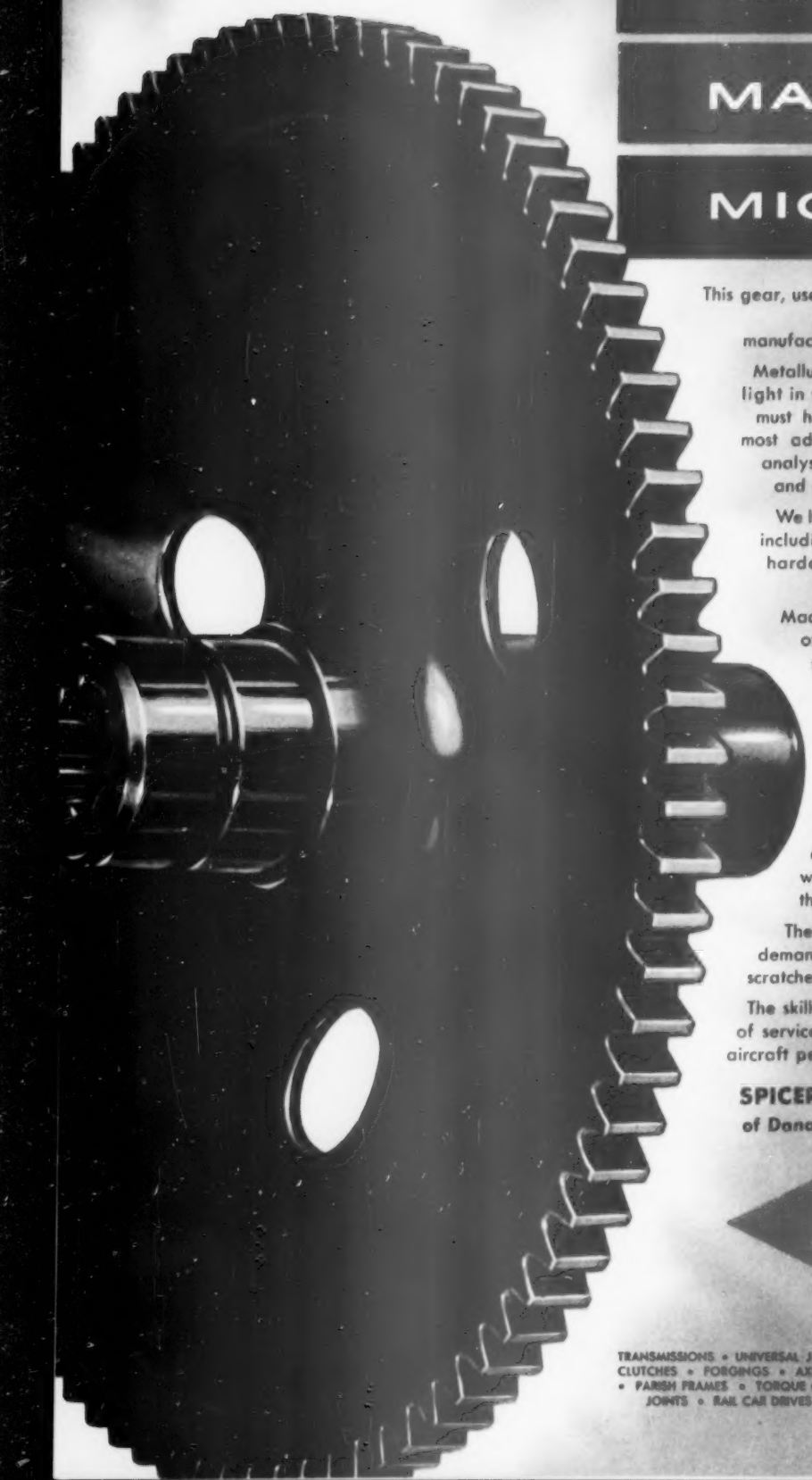
Spicer

A Masterpiece of

METALLURGY

MACHINING

MICROMETRY



This gear, used in the J-47 jet engines, is typical of the superb workmanship exercised by Spicer in manufacturing aircraft gears.

Metallurgy is of prime importance. The parts are light in weight, with thin sections, and therefore must have maximum high strength. We have the most advanced metallurgical laboratory, for the analysis of chemistry of steels, inspection for flaws, and assurance of proper grain flow in forgings.

We have the newest equipment for heat treating, including gas carburizers, homo-carbs, rotary hardening furnaces, and a variety of quench presses and dies to control distortion.

Machining of these gears is held to tolerances of .0002 on the teeth. The cutting, grinding, shaving of gears and splines, and plating, is done on the finest precision equipment in the industry. Since aircraft parts must be completely interchangeable in the case of these gear units, absolute consistency must be assured.

And because aircraft engines must be highly resistant to wear, erosion, corrosion, and abrasion, the physical dimensions as well as finish, hardness and depth of hardness, the most delicate controls available are used.

The high stress under which the gears operate demand that the surfaces be absolutely free of scratches, and in most cases be very highly polished.

The skills which Spicer has developed in 50 years of service to the automotive industry now serve the aircraft people equally well.

SPICER MANUFACTURING DIVISION
of Dana Corporation • Toledo 1, Ohio

49 YEARS OF Spicer SERVICE

ENGINEERING DANA MANUFACTURING

TRANSMISSIONS • UNIVERSAL JOINTS • PROPELLER SHAFTS • BROWN-LIPE AND AUBURN CLUTCHES • FORGINGS • AXLES • STAMPINGS • SPICER "BROWN-LIPE" GEAR BOXES • PARISH FRAMES • TORQUE CONVERTERS • POWER TAKE-OFFS • POWER TAKE-OFF JOINTS • RAIL CAR DRIVES • RAILWAY GENERATOR DRIVES • WELDED TUBING

Drilling contractors know how important it is to have a draw works that is dependable and economical. That's why more and more contractors are buying UNIT RIGS. The U-15 model is used more than any other make of draw works in its class*.

To get the facts about the dependability and economy of operating a UNIT RIG Draw Works . . . ask the drilling contractors who have been using them for more than 15 years.

**Over 1/6 of all draw works in operation today are UNIT RIG Model U-15's.*

FOR DRILLING TO 7,500 FEET . . . . . Buy a U-15. Most of the earliest U-15's manufactured are still in operation. The new features of later U-15's are designed for easy adaptation to the earlier models — therefore no U-15 need ever become obsolete. For complete information on the U-15 — write for catalog TODAY.

UNIT RIG
-&-
EQUIPMENT CO.
TULSA, OKLAHOMA U.S.A.

●DESIGNED FOR THE JOB....

UNIT RIG DRAW WORKS ARE SOLD EXCLUSIVELY THROUGH THESE AUTHORIZED DISTRIBUTORS IN THE U.S.A. AND CANADA

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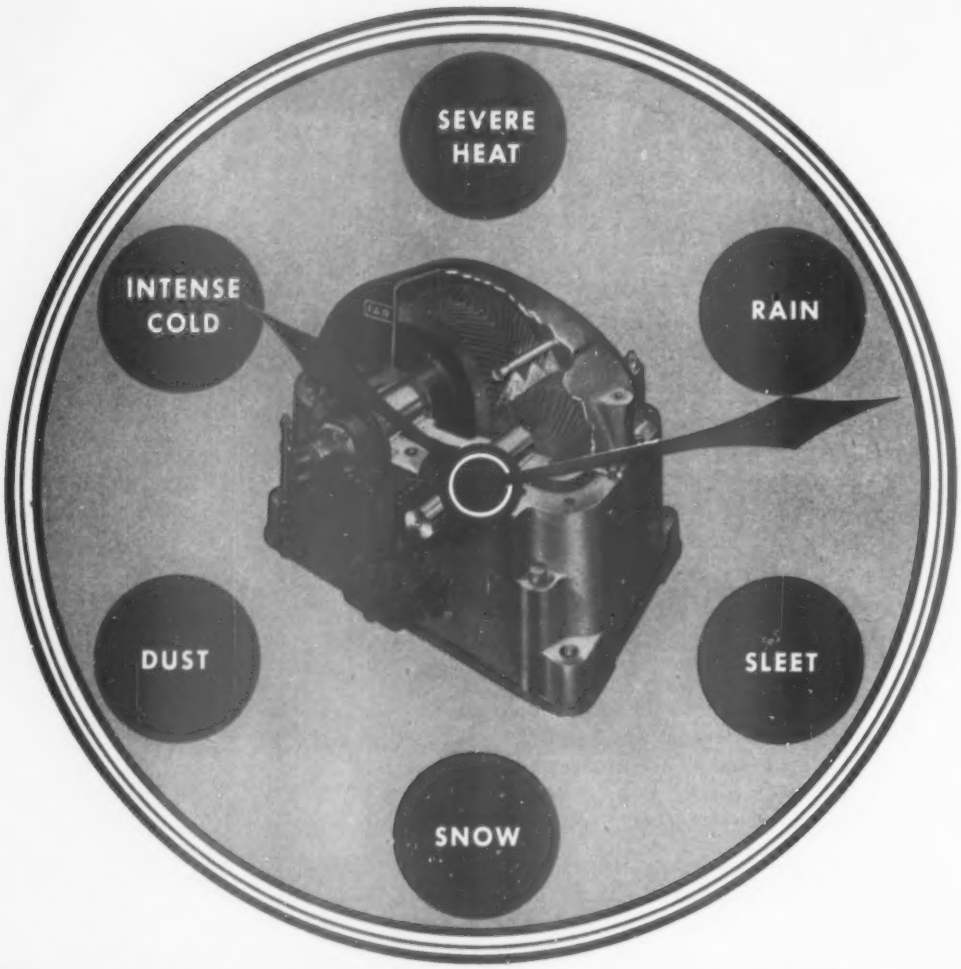
EXPORT SALES—MID-CONTINENT SUPPLY COMPANY, 42 Broadway, New York City. Cable—MIDUNITRIG



SPEED INCREASERS for 'round-the-clock service

Farrel® speed increasers are designed for continuous day and night operation under the most adverse conditions encountered in pipeline pumping service.

The "perfection" of the design is a matter of record. Since 1932, when the line was first developed, hundreds and hundreds of these units—totalling more than a quarter of a million horsepower—have been installed. And, every one is still operating successfully.

This amazing record is worth remembering the next time you are in the market for speed increasers. It provides a virtual guarantee of trouble-free operation.

The modern line consists of 49 standard sizes with speed ratios ranging from 1:1 to 12:1. For higher ratios, units using two sets of gears are supplied with ratio range from 12:1 to 40:1. Two-pinion units, designed to transmit power from a single engine to two pumps are also available.

For further details of these proved-on-the-job speed increasers, send for a copy of bulletin 448A. No cost or obligation.

FARREL-BIRMINGHAM COMPANY, INC.

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FB-844

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BOLTED STEEL TANKS

Number 1
in More Ways Than One

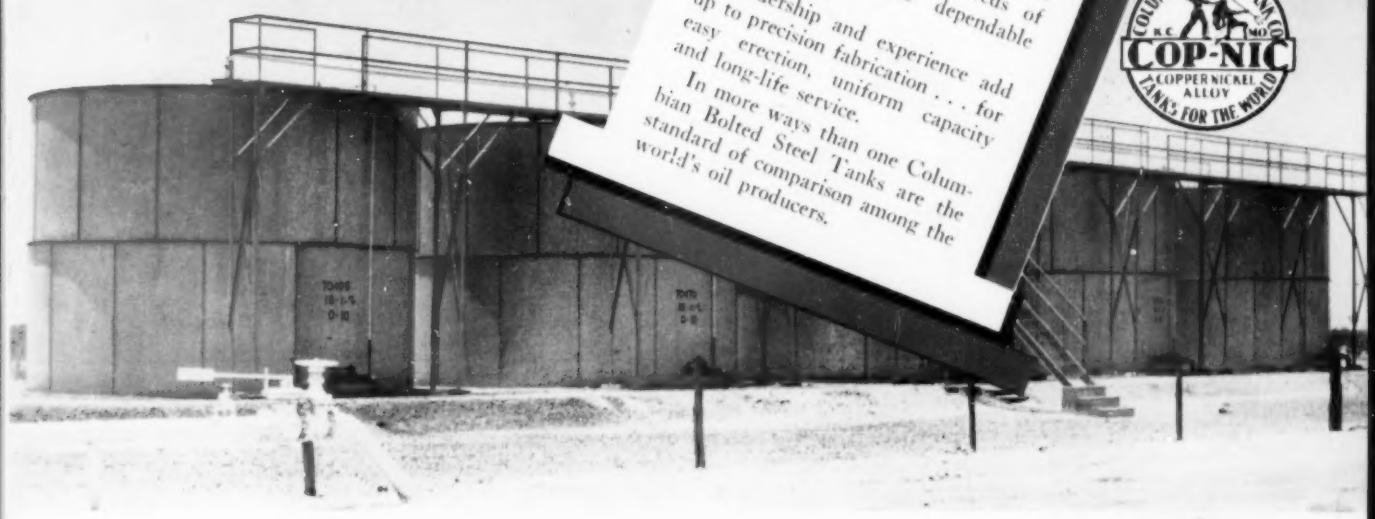
• There are more ways than one to figure greatest value and maximum economy in Bolted Steel Tanks. One is leadership and Columbian has led the field since pioneering the original designs over 35 years ago. Another is experience . . . the experience of years in producing hundreds of thousands of these dependable storage tanks.

Leadership and experience add up to precision fabrication . . . for easy erection, uniform capacity and long-life service.

In more ways than one Columbian Bolted Steel Tanks are the standard of comparison among the world's oil producers.

COLUMBIAN STEEL TANK COMPANY — TANKS FOR THE WORLD

COLUMBIAN STEEL TANK CO. — COP-NIC — COPPER NICKEL ALLOY — TANKS FOR THE WORLD



COLUMBIAN ALL-METAL BUILDINGS

Here's the proved money-saving answer to all your industrial housing problems. Rigid, strong, fire-safe, weather-tight. Require minimum upkeep. Ideal for warehouses, engine houses, garages, equipment and storage houses. Write for complete information.

DISTRIBUTORS TO SERVE YOU

COLORADO
O'Neill Tank Company
Sterling, Colorado

KANSAS
O'Neill Tank Company
P. O. Box 771
Great Bend, Kansas
Hays, Kansas — Hill City, Kansas

LOUISIANA
McGuffin Tank Company
P. O. Box 724
Shreveport, La.
McClatchery Tank & Supply Co.
Lafayette, La.

OKLAHOMA
Continental Tank Company
P. O. Box 5038—Farley Station
Oklahoma City, Oklahoma

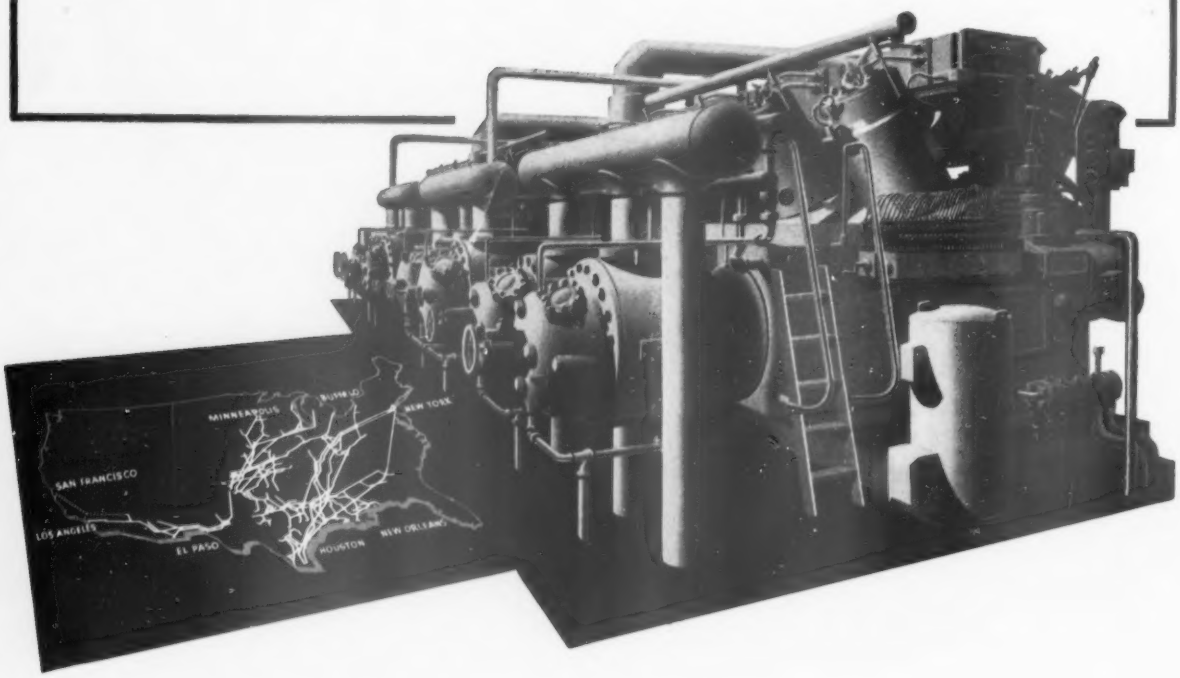
TEXAS
Gray-Brown Tank Company
P. O. Box 924
Longview, Texas
Gray-Brown Tank Company
P. O. Box 2006
Odessa, Texas
Mapp Tank Company
P. O. Box 1349
Odessa, Texas
Martin Tank Company
P. O. Box 135
Corsicana, Texas — Kilgore, Texas
Continental Tank Company
Snyder, Texas — Midland, Texas
Federal Tank Company, Inc.
706 City National Bank Bldg.
Houston, Texas
Jackson Equipment Co.
P. O. Box 1625
Wichita Falls, Texas
Westex Tank Company
P. O. Box 941
Odessa, Texas
Columbian Steel Tank Company
(Warehouse)
3705 McKinney Ave.
Houston, Texas
B. A. Box
P. O. Box 42
Beeville, Texas

WYOMING
O'Neill Tank Company
P. O. Box 154
Casper, Wyoming

COLUMBIAN STEEL TANK CO., P. O. Box 4048-J, Kansas City Mo.

GULF SECURITY OIL

provides better lubrication
for pipe line compressor units,
helps prevent operating troubles



Here's the lubricant you can depend on to help keep your pumping stations operating smoothly and continuously—Gulf Security Oil. It provides effective protection for cylinders and bearings in both engines and compressors.

Because of its excellent resistance to oxidation, Gulf Security Oil stands up for many hundreds of hours without any appreciable change in its original properties. After years of operation with this quality lubricant, equipment shows remarkable freedom from cylinder wear and a minimum of carbon deposits on valves and rings. And because oil control rings are kept clean, oil consumption is remarkably low.

Operators of the many units lubricated with Gulf Security Oil report that this quality lubricant helps them get more operating hours between overhauls, and avoid unscheduled shutdowns.

For additional information on Gulf Security Oil and for the services of a Gulf Sales Engineer, get in touch with your nearest Gulf office today. Write, wire, or phone.

Gulf Oil Corporation · Gulf Refining Company,
Pittsburgh 30, Pennsylvania.

GULF INDUSTRIAL LUBRICATION

TAKE NO CHANCES WITH SLIGHT LEAKAGE

APPLICATION: Where even slight leakage of a flowing medium might become obnoxious, dangerous or excessively expensive.

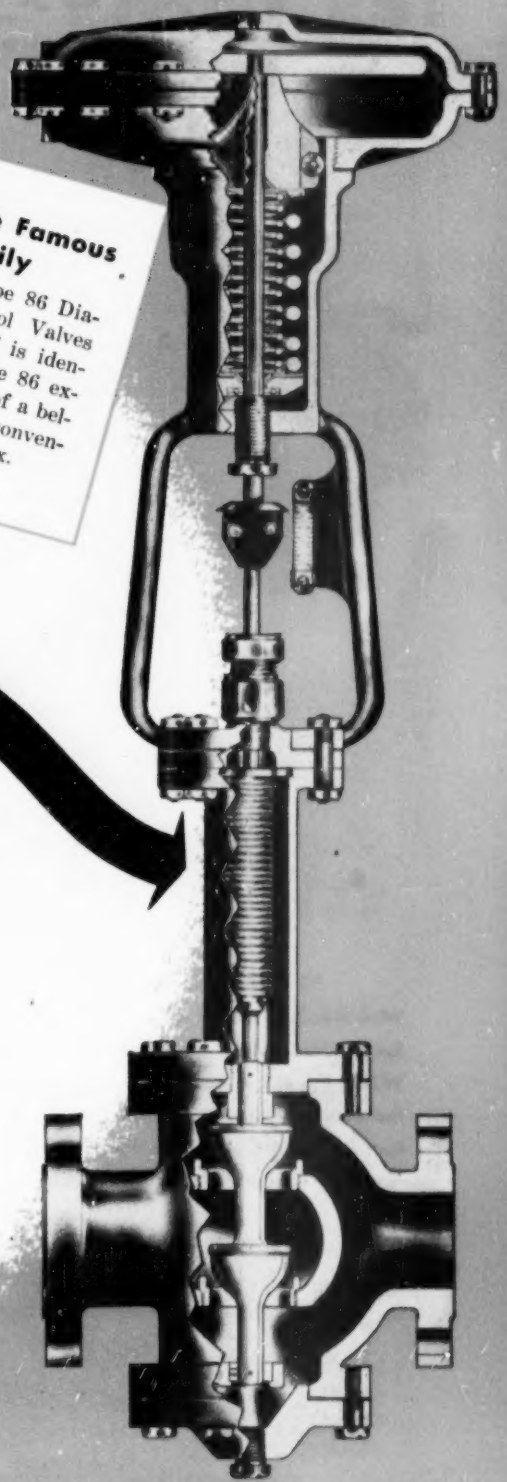
Specify

BS&B CLIMAX

Type 87 Diaphragm Control Valves

From The Famous Family

of Climax Type 86 Diaphragm Control Valves . . . the Type 87 is identical to the Type 86 except for the use of a bellows seal plus a conventional stuffing box.



. . . with bellows sealed stem

Climax Type 87 Diaphragm Control Valves were especially developed by BS&B for the oil, gas and chemical processing industries to provide a valve which is absolutely leak-proof. All Type 87 valve bodies are designed to conform to I. S. A. tentative face-to-face standards. Design features BS&B's interchangeability-of-parts advantage for greater operating and maintenance economy.

Type 87 is manufactured for all services and in all materials that are contemplated by Type 86, and in sizes from ½" to 6". Bellows can be supplied in bronze, stainless steel, Monel, Hastelloy "B", Nickel or other special alloys suitable. Maximum working pressure 400 lbs. cwp. The conventional teflon packed stuffing box is installed at the point the valve stem passes out of the bellows casing to forestall any appreciable loss of flowing medium in case of a bellows failure.

ASK YOUR BS&B MAN OR SALES REPRESENTATIVE . . . or write to Black, Sivalls & Bryson, a leader for over 60 years in oil and gas producing and refining equipment . . . manufacturer of the finest in controls and equipment for the processing industries . . . 54 Branches and Sales Offices in the United States and Canada.

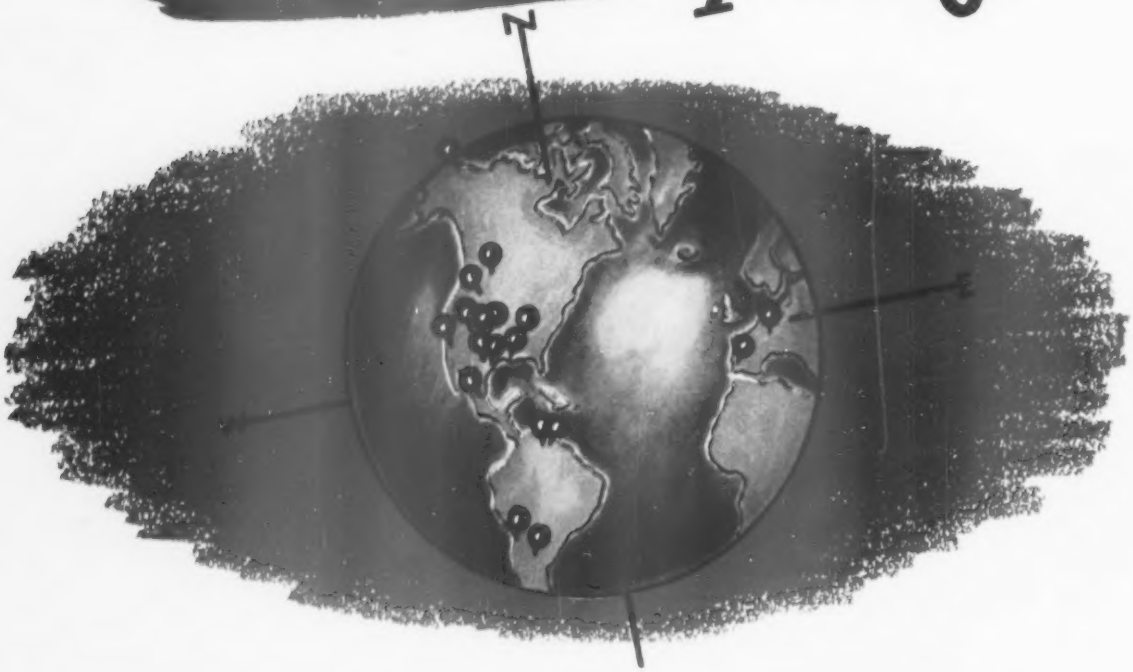
CLIMAX BS&B CONTROLS OVER 60 YEARS

BLACK, SIVALLS & BRYSON, INC.

Climax Controls Division, Dept. 4-A10

7500 East 12th St. Kansas City 26, Missouri

Wherever you go



. . . it's Wilson rigs

Wherever you go, in any oil producing area on the face of the globe, you'll find Wilson rigs on the job. Wilson has continued their parade of progress, through the years, building fine winches and drilling rigs which last for many years. Wilson is the only manufacturer making all sizes of rigs, in all types, with all control systems, all levels, and all transmission systems for every purpose and condition. As for depth, you can have a Wilson Rig for drilling wells from 2,000 to 20,000 feet. Look to Wilson for complete dependability in a drilling rig.

THE NEW WILSON ATLAS RIG
Rated Capacity:
10,000 ft. 4½" Drill Pipe
11,500 ft. 3½" Drill Pipe

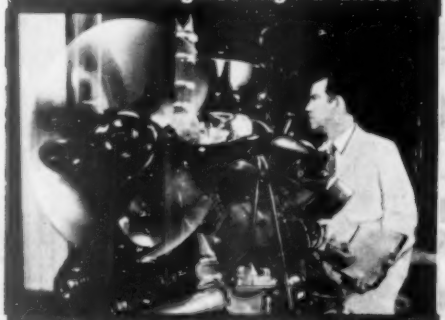
Compare Features... Quality... Prices

Wilson MANUFACTURING CO., Inc.
WICHITA FALLS, TEXAS

You'll be far ahead of the field with

FORD INDUSTRIAL ENGINES!

Constant Engineering Advances



Matchless Research Facilities

High-Precision Standards

Mass Production Savings

Always at your Service

Experienced Ford Sales Engineers will gladly prepare recommendations for the efficient use of Ford Industrial Power in your application.

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED!

Here's why—

These are hard-fisted facts that equipment manufacturers and users should know about!

As these pictures portray, the engineering and manufacturing facilities of the Ford Motor Company are unmatched in the field of Industrial Power. This has resulted in advanced features of engine design that are years ahead of the industrial field.

Let us mention just a few for example: Ford offers a choice of six engines varying in displacement from 134 cu. in. to 317 cu. in. in the popular range. Of these, four are latest design overhead valve, short stroke, low-friction, high-compression type, that deliver more actual power at the clutch than was formerly possible in any engines of comparable size. Features include precision-molded, fully counter-balanced crankshafts; full-flow oil filters; free-type, self-rotating valves; rigid, deep-skirt crankcase and many others. These advancements mean longer engine life and lower operating cost.

Every Ford Industrial Engine or Power Unit is a complete assembly, fitted with a long list of standard equipment *at no extra cost*. All are *thoroughly tested* before shipment and are *ready-to-run!* In a word or two, Ford Industrial Power provides unexcelled efficiency . . . not only more power per pound, but more power per cubic inch displacement at low piston speed.

We will be happy to send you descriptive folders with complete information. Why not write or . . . if necessary . . . wire us today?

INDUSTRIAL ENGINE DEPARTMENT

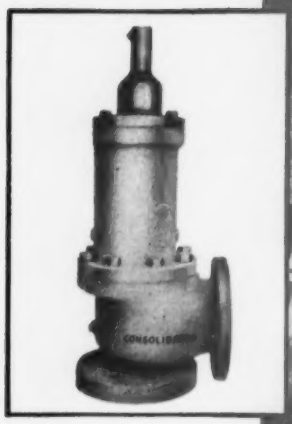
FORD MOTOR COMPANY

15050 Woodward Ave., Highland Park 3, Mich.

Nation-wide Parts and Service Availability

INDUSTRIAL ENGINES AND POWER UNITS

ALWAYS ALERT TO DANGER . . .



CONSOLIDATED SAFETY RELIEF VALVES

The hazards of uncontrolled overpressures are easy to avoid. Consolidated Safety Relief Valves assure *absolute protection* for personnel, plant and processing equipment. They don't leak under discharge piping stresses because their design incorporates outside bevel seat and floating guide construction. The disc seats on a radial seating surface — dependable tightness is assured in all positions within the deflection range. Unfired pressure vessels — gas, vapor, and liquid storage tanks, pipelines, pumps — are dependably safeguarded against overpressures, even in the severest services.

Consolidated Safety Relief Valves have 25% fewer parts than ordinary valves of their type. Naturally, maintenance problems are greatly reduced and service life is increased, while standardization is simplified. Materials of the highest quality, precision workmanship and rigid tests assure continuously reliable performance at the rated capacity. Full information is yours on request.

YOUR INDUSTRIAL SUPPLY DISTRIBUTOR has all kinds of experience in meeting the most exacting requirements of the processing industries. You can count on his ability, knowledge and facilities for the best in products and service. Phone or write him today.

1879 CONSOLIDATED U.S.A.

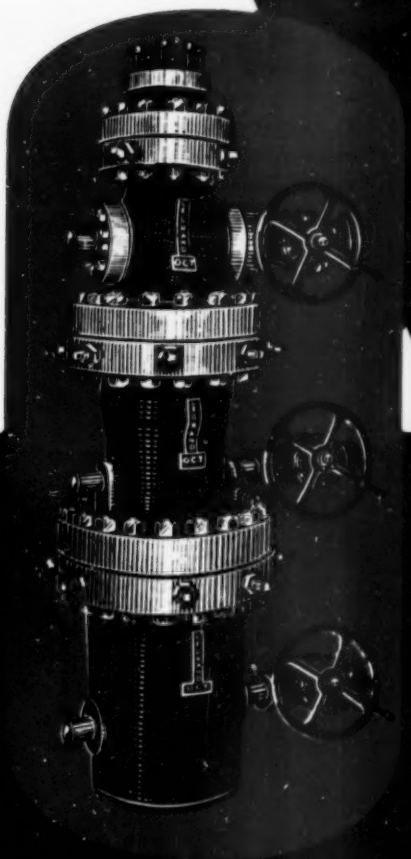
MAXWELL MANNING MM TRADE MARK

CONSOLIDATED SAFETY RELIEF VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** TULSA, OKLAHOMA

MAKERS OF 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL INSTRUMENTS, 'ASHCROFT' GAUGES, 'HANCOCK' VALVES, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

A UNIT FOR EVERY NEED



Pumping Units are in service in many of the World's oilfields. They have many attractive features which make them the ideal choice for all pumping conditions.

Le Grand - O.C.T. wellhead and flow control equipment in a wide pressure range to suit all types of well is also manufactured under licence from the Oil Center Tool Co., Houston, Texas, U.S.A.

Details of our complete range of equipment will be sent with pleasure upon request.

LE GRAND, SUTCLIFF & GELL, LTD.

HORSTED AIRPORT, ROCHESTER, KENT, ENGLAND.

LE GRAND

Represented in the following areas by agents who will be pleased to assist you.

TRINIDAD -
The Industrial Agencies Ltd.
14 High Street,
San Fernando.

EASTERN VENEZUELA -
A - Z Export S.A.
Apartado 4026.
Puerto La Cruz.

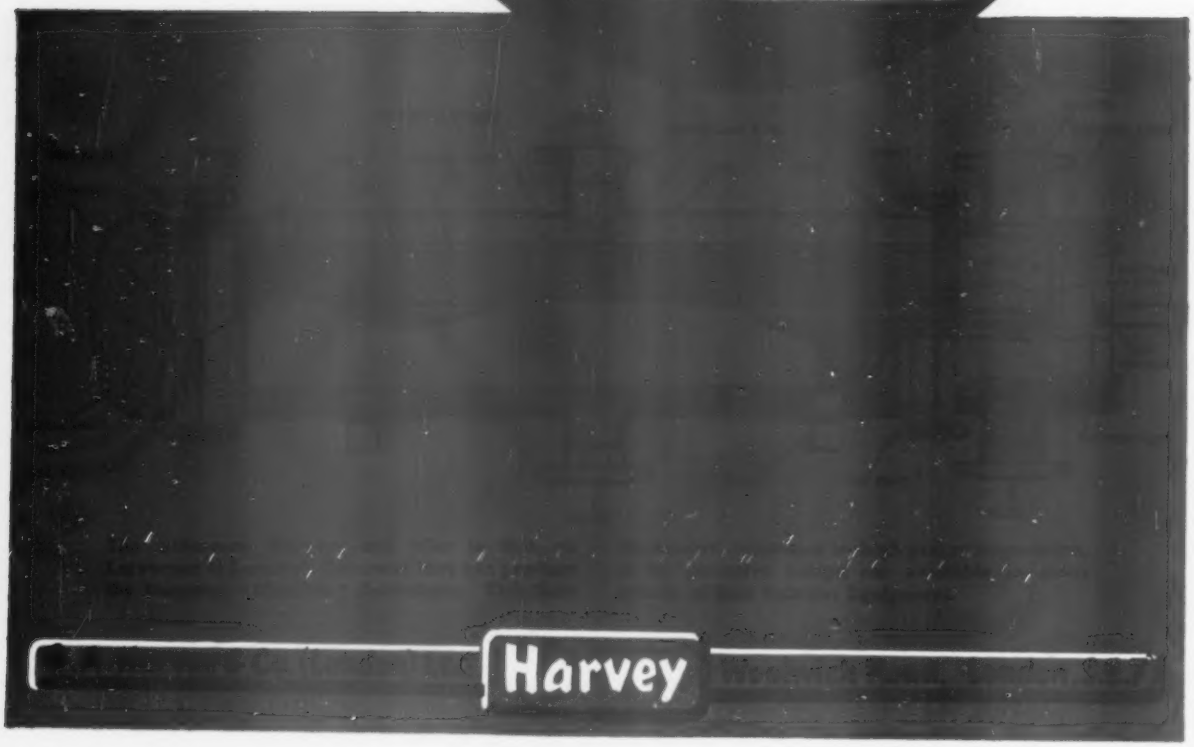
WESTERN VENEZUELA -
A - Z Export S.A.,
Apartado 304,
Maracaibo.

Heat Exchangers — with a difference

Long recognised as an aid to efficient industrial production, the modern Heat Exchanger operating through a wide range of temperatures and pressures can help towards increased production and lowered costs in *your* business. Many Industries, such as the Petroleum Refining and Chemical Processing, are obvious users of Heat Exchangers in one form or another ; important others can readily be found amongst the following: — PAPER MAKING · AIR CONDITIONING SHIPBUILDING · FOOD PROCESSING · POWER GENERATION · TEXTILE MANUFACTURE · WATER WORKS.

The matter may be urgent, delay can be costly. Harveys deal with enquiries immediately.

The skill of trained operatives combined with extensive shop facilities, and backed by Harveys experience in the application of Heat Transfer Equipment to Industry is at your service now.



AHEAD OF THE BARGE

First there's financing by the FIRST in Dallas

the Southwest's Pioneer Oil Bank

FIRST NATIONAL BANK IN DALLAS

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

Give us an opportunity to say YES

Wagner
ELECTRIC MOTORS
... the choice of leaders in industry

OIL WELL PUMPING MOTORS

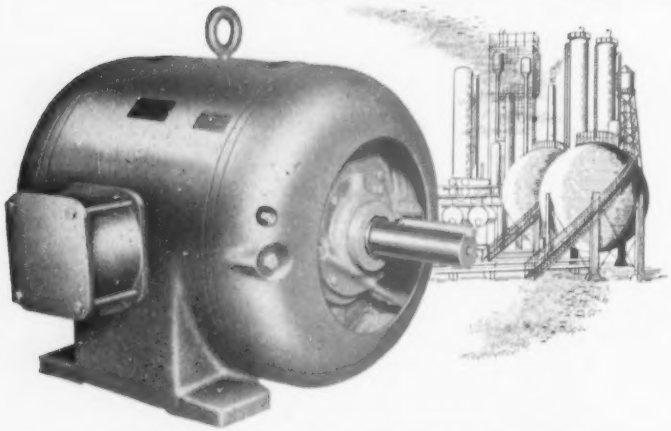
... POLYPHASE, SINGLE-PHASE

These cast-iron frame motors, especially designed for outdoor service, have double-end ventilation. Baffles inside the end-plates direct a cooling air flow around the stator iron and windings, while retarding the entrance of water. Motor windings are specially treated for outdoor service and the conduit box is moisture-proof and dust tight. These motors are available in ratings through 75 hp and are built in two electrical types: high torque, normal slip; and high torque, high slip.

Wagner MOTORS

time-tested favorites of the oil fields

in the field ... in the refinery



EXPLOSION-PROOF MOTORS

These polyphase motors have been approved by Underwriters' Laboratories for Class I Group D hazardous locations. They feature housings strong enough to withstand explosion inside the motor, machined fits long enough to prevent the escape of flames to the surrounding atmosphere, and heat capacity great enough (even under abnormal operating conditions) to prevent the motor from reaching a temperature which would ignite surrounding gases. These totally-enclosed fan-cooled motors are available in ratings through 250 hp, with a choice of cast-iron frame or steel frame construction.

For locations where only single-phase current is available, Wagner can furnish capacitor-type oil well pumping motors.

Write for Bulletin MU-137 on Oil Well Pumping Motors and Bulletin MU-185 on the complete line of Wagner Motors. Thirty-two branch offices are ready to assist you in any motor application problem.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6389 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS – AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

M53-8

"Can you furnish an efficient heat exchanger for 2 fluids of different transfer rates?"

"I need a stock design of heat exchanger for quick shipment."

"Do you have a standardized heat exchanger that can be used for a variety of services?"

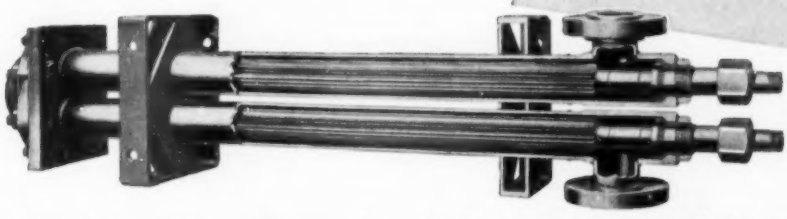
"Is it possible to get a heat exchanger with fins and tubes of different materials?"

"I want a heater system that will require least spare units."

FIVE QUESTIONS

One Answer...

THE G-R TWIN G-FIN SECTION



Yes, this "Universal Heat Exchanger" meets all these needs . . . and many more. It actually has the widest range of heating, cooling, condensing and heat exchange applications of any heat transfer apparatus on the market. • The G-R Twin G-Fin Section has proved its effective design and durable construction through 20 years of service. • This unit is the simplest type of heat exchanger, easy to install, economical to maintain, and with high salvage value because of its standardized design. Write for bulletin describing the many Twin G-Fin Section advantages in detail.

THE GRISCOM-RUSSELL CO., MASSILLON, OHIO

GR-566

GRISCOM-RUSSELL

PIONEERS IN HEAT TRANSFER APPARATUS

WHY C-H OIL WELL PUMPING CONTROL is genuine Oil Country Control

Cutler-Hammer Program Time Switch gives automatically scheduled pumping, set up easily by means of pull tabs—one for each 15 minute interval.

There are no overstated claims about Cutler-Hammer Oil Country Pumping Control. To design and build it, we went to the oil country. We talked to oil men. We saw what was happening, because of heat, dirt, lightning, etc., what was lacking, what was needed.

Listen to this: Silver aluminum case finish to bounce the sun rays off. Ventilating openings top and bottom to create a chimney draft that carries heated air away. Contacts "out in the open" to radiate heat. Louvred, screened and baffled openings to shut out dust and dirt, and bugs. Vertical contacts to shed dust. Neoprene gasketed timer mechanism; an excess torque clock motor that "ticks" along even if dust gets in.

Three coil overload protection where single phasing is a problem; otherwise standard two-coil. Undervoltage relays for manual restarting; automatic "all-at-once" or staggered starting; or easy change from one to the other.

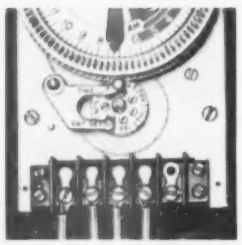
Easy on-off sequence changes, in 15 minute increments, giving you any sequence you want. Automatic day omission is optional.

Unit lightning arresters that tell you which one is blown—yet *don't* blow up the mechanism too.

These are just some of the features that make Cutler-Hammer the most popular control throughout the oil fields, from Pennsylvania to the Gulf and the Pacific. Try it once, you'll use it always.

CUTLER-HAMMER, Inc., 1453 St. Paul Avenue, Milwaukee 1, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto, Ontario.

MEMBER AMERICAN PETROLEUM INSTITUTE

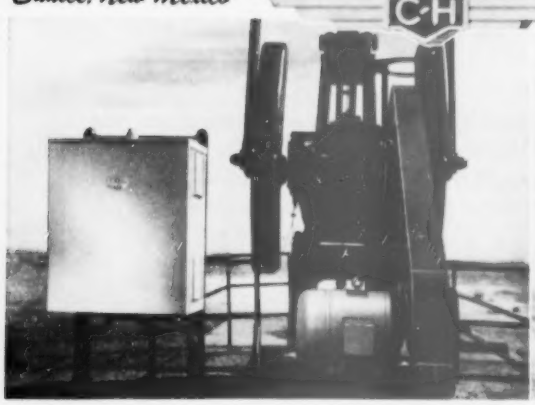


Cutler-Hammer 9589 Oil Well Pumping Controller with 3 coil overload protection and time delay relay.

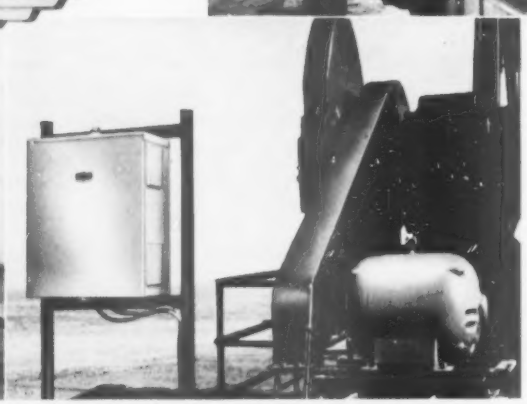
Day-omission feature —for non-operation any selected days of week.

CUTLER-HAMMER
MOTOR CONTROL
C-H

Eunice, New Mexico

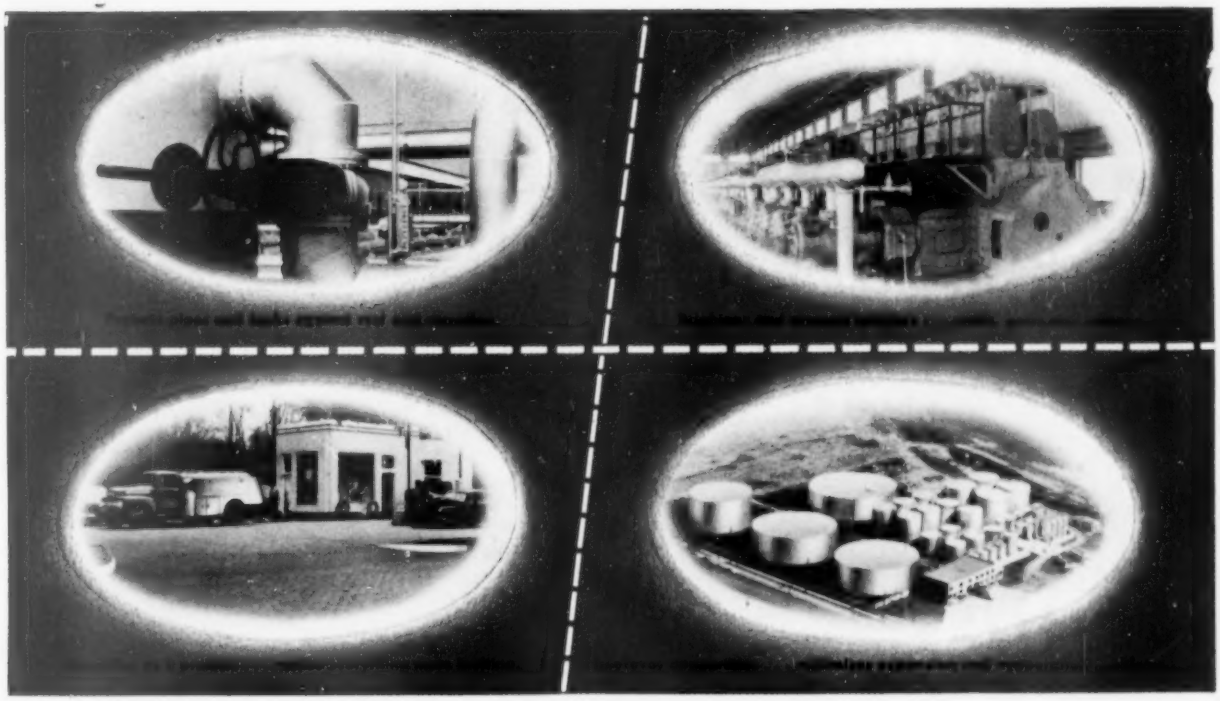


Carter County, Okla.



Scurry County, Texas

A Shining Coat of Armor-



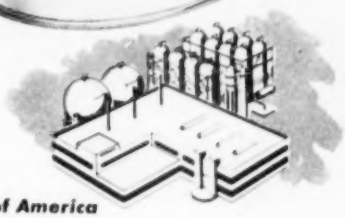
"Liquid Aluminum"

Maintenance problems diminish . . . and the whole site takes on an attractive, sparkling, well-kept appearance when *Liquid Aluminum* is used. It's the petroleum industry's most protective and beautiful coating. Use it inside and outside. Gleaming *Liquid Aluminum* is amazingly resistant to money-eating rust . . . it also resists corrosion from smoke and fumes. It reflects up to 85% of heat and light rays and thus reduces evaporation losses . . . minimizes expansion and contraction problems . . . and makes plant interiors and exteriors brighter and more cheerful.

Look for the *Liquid Aluminum* label on the aluminum paint you specify. It's made to approved standards by leading paint manufacturers. Ask your paint supplier or write for names of manufacturers to Reynolds Metals Company, 2595 South Third Street, Louisville 1, Kentucky.

1-Coat Protection for Your Built-up or Rustable Metal Roofs

It's *Liquid Aluminum* Roof Paint or Coating with this label and this warranty. It reflects harmful sun rays . . . protects against all kinds of weather . . . adds years to roof life. The *Liquid Aluminum* label and the special Warranty Seal are your assurance of top quality. Write for folder.



This advertisement appears in the interest of the Paint Industry of America

EATON TANDEMS— the most economical units available for increasing payload in proportion to gross weight

EATON AXLES — The load-carrying and moving components — are performance-proved by thousands of units and millions of miles of service. They are installed in the position for which designed and, therefore, are not subject to abnormal stresses or to unnatural lubricating problems.

- The single drive line permits a natural angle and direct lead of the propeller shafts; eliminates excess parts; simplifies maintenance.
- The power divider, of simple design, assures the transmission of power equally to both axles.
- A third differential in the power divider assures equalized power transmission to the driving wheels even though wheel speed may be variable due to road irregularities or differences in tire diameter.
- The differential lock between forward and rear axles (optional on some models) is positive in action. With unfavorable road conditions such as mud, snow, and ice, this feature makes maximum traction available when required.

Let your truck dealer explain how Eaton Tandem Drive Axles will give your trucks greater load capacity and at the same time reduce tire maintenance and operating costs.

EATON — AXLE DIVISION — MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

New Emsco R-series traveling blocks

fast-falling . . . straight-traveling . . . safer and easier to operate

E-139-F-53

From the R-30 (smallest) to R-60 (largest), the Emsco R-Series blocks are identical in design and performance characteristics. They are narrower and more slimlined than previous models . . . with a new low center of gravity that eliminates canting.

Load capacities of the new blocks are based on A.P.I. ratings and are matched to the load capacities of existing swivels and hooks. Drilling crews will find the R-Series blocks safer to operate and easier to handle, service and maintain.

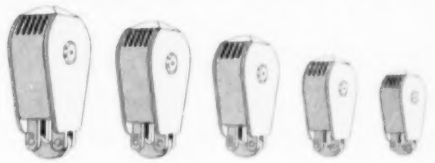
Sheaves of the R-Series blocks are stronger and longer wearing. In the three larger models, the sheaves are made of alloy steel with one-piece, rolled forged steel rims. The sheaves of the smaller blocks are made entirely of pressed forged steel. The grooves are flame-hardened to reduce wire line wear.

An important new feature of the blocks is a reversible lubrication cartridge that can be inserted from either side. Thus the block can be reversed to balance sheave wear and still have the lubrication fittings accessible from the working platform.

MATCHED BLOCKS

for shallowest to deepest drilling

MODEL NUMBERS INDICATE DIAMETER OF SHEAVES



R-60	R-52	R-44	R-36	R-30
450 TONS	450 TONS	300 TONS	200 TONS	125 TONS

EMSCO

EMSCO MANUFACTURING COMPANY

Houston, Tex. LOS ANGELES, CALIF. Garland, Tex.

CONTINENTAL

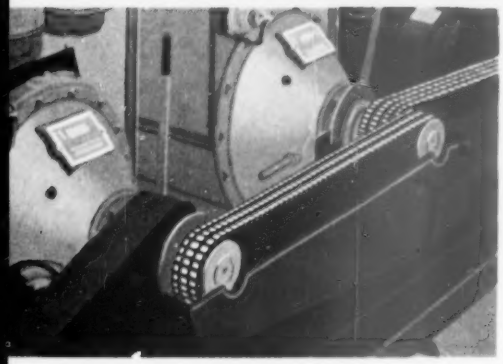
"SERVING THE OIL AND GAS INDUSTRIES"

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

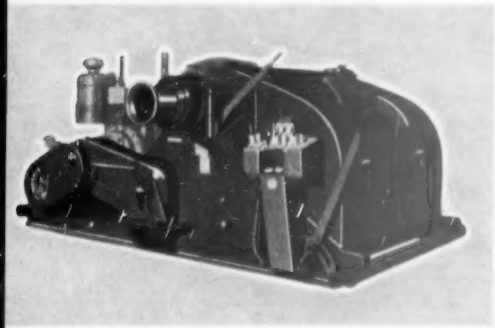
Export Div.: The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N. Y.
The Continental Supply Company, Limited, 218 Lancaster Bldg., Calgary, Alberta

Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

Engineered and built by Emsco — Sold by Continental



Chain Drive gives choice of Prime Movers. A chain drive between the built-in hydraulic torque converter and engine (or engines) gives the operator complete freedom in his selection of power. Any make of high or low speed engine, coming within the horsepower limits, may be used by applying proper chain drive ratio between the power source and torque converter.



GB-160-T (single drum) torque converter rig, designed for use where sand reel is not required. Its twin is the GB-160-TS (double drum).

EMSCO MANUFACTURING COMPANY

Houston, Tex. LOS ANGELES, CALIF. Garland, Tex.

TIME-SAVING LITTLE RIGS

with big rig quality

You reduce rigging up time and cut costs with Emsco's torque converter rigs—GB-160-T and GB-250-T—designed for shallow to medium drilling, workover and servicing.

All controls are centralized at the driller's position, with one-lever controls for hoisting and for rotating. The controls are forward-mounted to give the driller an unobstructed view of all floor and derrick operations. Friction clutches are direct air-operated.

Portability of these rigs gets you on and off the job faster. Packaged as a unit, they can be moved without breaking oil or air lines.

An infinite range of speeds is provided by an inboard-mounted torque converter driving through a low and high speed herringbone gear transmission. This assures smoother, faster, more economical operation.

Both the GB-160-T and GB-250-T are equipped with neutral brakes for greater safety and ease of operation. The totally enclosed chain drives and two-speed transmissions are lubricated by independent and separate lubrication systems.

Engineered and Built by Emsco — Sold by Continental

EMSCO

REG. U.S. PAT. OFF.

E-139-B-53

CONTINENTAL

"SERVING THE OIL AND GAS INDUSTRIES"

THE CONTINENTAL SUPPLY COMPANY, General Offices: DALLAS, TEXAS

Export Div.: The Continental Supply Co., Inc., 30 Rockefeller Plaza, New York, N. Y.

The Continental Supply Company, Limited, 216 Lancaster Bldg., Calgary, Alberta

Representatives: Argentina, Bolivia, Brazil, Chile, Colombia, England, Ecuador, Peru, Trinidad, Uruguay, Venezuela

Make Your Own Hose Lines

AEROQUIP HOSE AND FITTINGS ARE MATCHED FOR GUARANTEED PERFORMANCE

No skill or special training is required to assemble Aeroquip Flexible Hose Lines by hand *in a matter of minutes!* YOU CUT COSTS because Aeroquip fittings are detachable and may be used again and again. YOU REDUCE INVENTORY because with Aeroquip bulk hose and a few fittings you can fill practically all your hose line requirements. YOU REDUCE DOWNTIME because with Aeroquip on hand, quick hose line replacements are available at all times.

Cut hose to length with hacksaw; screw into socket.

Oil nipple and inside of hose liberally.

Screw nipple into socket and hose.

Install fitting on other end; hose line is ready for use.

Aeroquip

REG. TRADE MARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

SALES OFFICES: BURBANK, CALIF. • DAYTON, OHIO • HAGERSTOWN, MD. • HIGH POINT, N. C. • MIAMI SPRINGS, FLA. MINNEAPOLIS, MINN. • PORTLAND, ORE. • WICHITA, KAN. • TORONTO, CANADA

AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

TRANSFERRING LUMP ENAMEL FROM TRUCKS TO HEATING KETTLES.

cold facts . . . hot solution

Applied hot, coal-tar enamels are the lasting answer to the problems of protecting steel pipe. Properly prepared, properly applied — coal-tar protective coatings provide the long-lasting protection pipeline planners have a right to expect. That's why it pays to specify BARRETT. You get the best coal-tar coatings ever made, plus the services and application supervision of Barrett's Technical Service Group.

Barrett Advisors assist you in the planning stage. You are assured that your pipeline investment will receive the best protection at lowest cost. Barrett Service Representatives follow through at the pipeline site . . . checking, advising and supervising applications until the pipe is *safely* underground.

Feel free to use Barrett's Technical Service Group at any time. For more detailed information contact Barrett. There is no cost or obligation.

Barrett®

®Reg. U. S. Pat. Off.

BARRETT DIVISION

Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

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The Barrett Company, Ltd., 5551 St. Hubert Street, Montreal, Que.

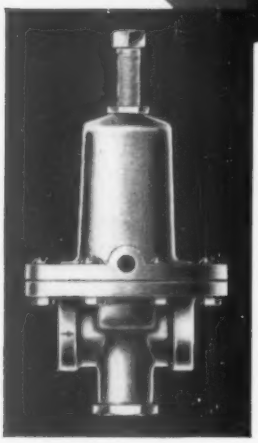
FISHER®

SMALL VOLUME REGULATORS

TYPE 67FRTC

A "PACKAGED UNIT" — REGULATOR FILTER and PRESSURE GAUGE

Fisher Series 67 and 67FR Regulators have won universal acceptance for small volume air or gas flows. They are ideal for hundreds of industrial applications and are particularly adapted to instrument air service, supplying 20 lbs. operating medium pressure to pilot operated regulators. Capacity up to 6 C.F.M. Outlet pressure setting: 0 to 100 pounds depending on spring selected — gauge ranges to correspond. ¼" inlet and outlet. For further details and complete specifications, write for Fisher Bulletin 67.



TYPE 64

MASTER INSTRUMENT AIR REGULATOR

Type 64 is especially suited as a reducing regulator to maintain a constant operating medium feeding a manifold line to several pilot operated controllers or instruments. The high capacity of this regulator eliminates the need for an instrument air regulator for each pilot.

SIZE ½" inlet and outlet. Pressure ranges: Maximum inlet — 250 psi at 150° F. Reduced 3 to 60 psi. Maximum capacity: 30 C. F. M.

WRITE FOR BULLETIN C-64

TYPE 67

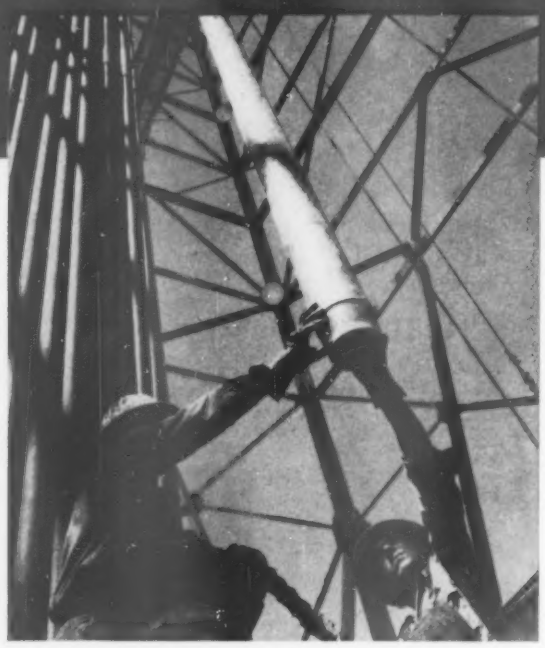
... with handwheel adjusting screw. Also available as Type 67P for panel mounting.

FISHER GOVERNOR COMPANY • Marshalltown, Iowa

LEADS THE INDUSTRY IN RESEARCH FOR BETTER PRESSURE CONTROL

FISHER Since 1880

SPANG® OIL FIELD



SPANG DOUBLE SEAL SHRINK THREAD DRILL PIPE AND TOOL JOINTS — The accurately mating seals in Spangs' Double Seal Shrink Thread Drill Pipe & Tool Joints are the major reasons for these advantages reported by drillers:

- Reduction in failures and costly down-time
- Complete sealing against internal and external pressures
- Rapid replacement of tool joints right at the rig

SPANGWELD — Developed with the double purpose of reducing the initial as well as the operating cost of drilling strings, Spangweld Drill Pipe combines these major construction features:

- Tool joints flash-welded to drill pipe
- Streamlined exterior contour
- Pipe and joint combinations in a complete range of internal and external diameters for every drilling requirement
- ¼ less threaded elements than conventional drill pipe and tool joint strings for faster handling

SPANG EXTREME LINE CASING — Here are seven good reasons why it pays to use this precision-manufactured casing for the really tough jobs:

- High joint strength
- Positive fluid seals
- Maximum running efficiency
- Minimum outside joint diameter
- Resistance to thread damage
- Streamlined interior and exterior contours
- Integral joints which eliminate half the threaded connections

SPANG GRADE P-110 EXTREME LINE CASING — Developed and precision-manufactured to meet the requirements of today's deep well drilling conditions, Spang Grade P-110 Extreme Line Casing has these features:

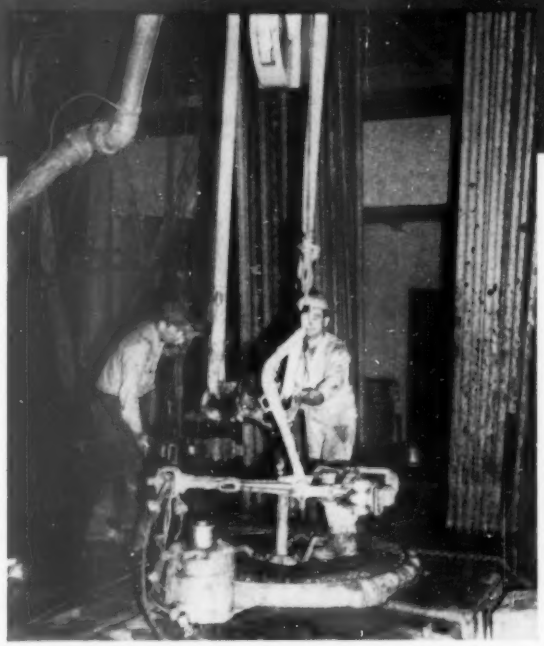
- Greater collapse, bursting and tensile strength than grades J-55 and N-80
- The ability to withstand the highest tensile loading and most extreme pressures encountered

Corrosion Resistant Plastic Coating For Spang Tubing and Drill Pipe

For increasing tubing and drill pipe life under corrosive conditions, a phenolic plastic coating is available for all Spang Tubing and Drill Pipe. Factory applied under quality control conditions and methods, an exceptionally superior internal plastic coating is assured. Ask the National Supply Representative about this Spang service.

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

TUBULAR PRODUCTS



Since the earliest days of the industry, Spang has been a familiar name throughout the world of oil. From the Spang-Chalfant Mills has come a complete line of standard and specialized oil country tubular goods, backed by a continuing, extensive research program which is geared to develop the most advanced products for economical drilling and production.

In these six tubular products you'll find the outstanding features which are evidence of the workmanship and quality behind the Spang trademark. Spang's day-by-day association with the petroleum industry is your continuing guarantee of dependable products and service.

SPANGSEAL TUBING—Designed for the economical production of high pressure condensate and flowing wells, Spangseal has these 5 major features which distinguish it from conventional threaded and coupled tubing:

- The integral joint with only two threaded elements
- The streamlined exterior contour which virtually eliminates "hanging-up"
- Metal-to-metal conical sealing surfaces at male and female thread ends which provide maximum leakage resistance
- The reduced outside diameter of the joint which increases hole clearance

SPANG EXTREME LINE TUBING—This precision-made tubing has an extremely high joint strength which makes it particularly useful for recovery from deep wells and high pressure wells. Here are some of the unique features and advantages characteristic of the Spang Extreme Line Tubing Joint:

- Wide, rugged Acme threads which provide fast joint make-up and maximum running speed
- The metal seal at small end of joint provides positive resistance to leakage
- 100% joint strength in all weights
- 50% of threaded connections eliminated by integral type joint giving high resistance to damage
- Streamlined interior and exterior contours, the first of which lends itself to the maximum protection given by plastic coating
- Positive shoulder contact engagement of male to female with adequate bearing assures proper make-up

THE LATEST BULLETINS on Spang Tubular Products contain more valuable information you'll want for your reference files. Write now for your copies or ask at the nearby National Supply Store.

SPANG-CHALFANT DIVISION

THE NATIONAL SUPPLY COMPANY

PITTSBURGH 30, PENNSYLVANIA

NATIONAL BLUE

DIVISION TUBULAR OFFICES: DENVER, COLORADO • HOUSTON, TEXAS FORT WORTH, TEXAS • LOS ANGELES, CALIFORNIA • PITTSBURGH, PENNSYLVANIA • TULSA, OKLAHOMA • CALGARY, ALBERTA, CANADA

Cleveland CU units shown here are at work in a gasoline plant in West Texas.

WORM GEARING—universal in its application—affords advantages for almost every power transmission job. Whether you want worm gearing sets or speed reducer units, you will find drives to meet your need in the complete Cleveland line.

Specify sturdy CLEVELAND CUs to drive high speed fans

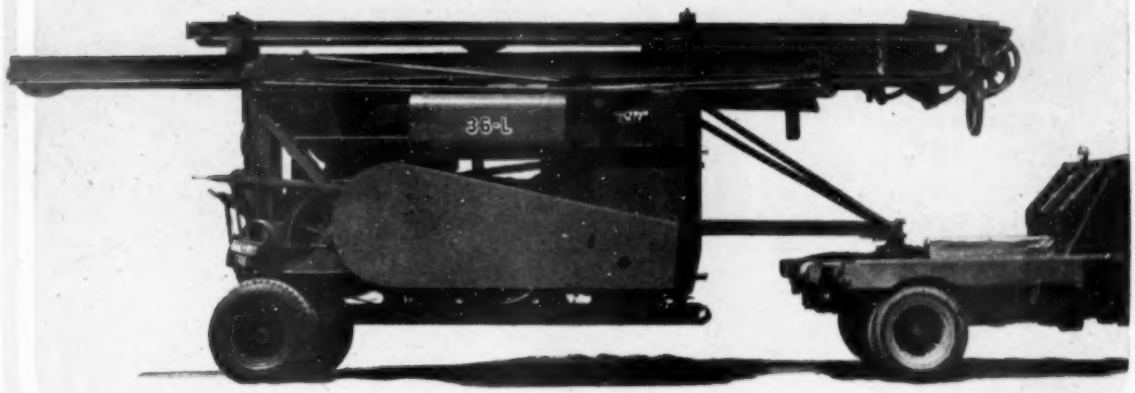
REFINERY men like the exceptionally sturdy construction of the Cleveland CU worm gear drive. That's why you see so many of these units on heat exchangers, driving large high speed fans. Its heavy-ribbed housing, large diameter fan shaft and long-wearing worm and gear enable it to operate year after year under most severe conditions. It is simple to install, easy to service in the field. Every Cleveland CU speed reducer is run in and pretested under load before it leaves the factory.

With greater emphasis on efficiency and low-cost operations, more and more companies find in this sturdy Cleveland CU unit the ideal heat exchanger drive—delivering trouble-free, economical service, operating at high speeds and under heavy loads year after year, throughout its long lifetime.

For complete description and engineering data, write for free Catalog 400. The Cleveland Worm & Gear Company, 3286 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

Increase Profits By Reducing Travel and Setup Time



Bucyrus-Erie spudders are designed to cut your non-revenue producing time and add it to profitable working time. These modern, highly mobile rigs are mounted as single axle or tandem-axle semi-trailers (tandem axles for 36-L and 48-L only), resulting in a compact unit that enables you to travel to and from jobs at normal highway speeds. All four models — 60-L, 28-L, 36-L and 48-L — are also offered with an easy-sliding skid mounting which permits entire unit to be loaded on and off trucks, derrick floors, or mud boats.

And when your Bucyrus-Erie spudder gets to the job, you're "making hole" in short order. The telescoping derrick is power raised and extended. Braces fall right into place. Even the large 48-L can be set up by four men in a few hours — the smaller models in considerably less time.

There are many other profit-producing features too. Investigate them all. See your Bucyrus-Erie distributor for information on the model suited to your working range. 10553

Long Distance Mobility
Speedy Derrick Setups

Just Two Reasons Why Bucyrus-Erie is

FIRST with the FINEST in Spudders

A BUCYRUS-ERIE SPUDDER DISTRIBUTOR IN EVERY MAJOR OIL REGION

BEACON SUPPLY CO. — Borger and Pampa, Tex.
BECKWITH MACHINERY CO. — Bradford, Clearfield and Pittsburgh, Pa.
BRADFORD SUPPLY CO. — Princeton, Ind.
BUCKEYE SUPPLY CO. — Chase and El Dorado, Kansas; Wooster and Zanesville, Ohio
DRILLERS SUPPLY CO. — Joplin, Mo.
DRILLING & MINING EQUIPMENT CO. — Los Angeles 21, Calif.
GREAT NORTHERN TOOL & SUPPLY CO. — Billings, Cut Bank, and Kevin, Mont.; Casper, Wyo.
IVERSON SUPPLY CO. — Oklahoma City, Okmulgee, and Tulsa, Okla.; Ft. Worth, Midland, Odessa, and Snyder, Tex.; Artesia and Farmington, N.M.
LUCEY CANADIAN SUPPLY CO., LTD. — Calgary and Edmonton, Alta.
THE McJUNKIN CORPORATION — Charleston, W. Va.; Allen, Ky.
NEWFOUNDLAND TRACTOR & EQUIPMENT CO. — St. John's, Nfld.
OLYMPIC SUPPLY CO. — Seattle, Wash.
THE STRAKER SUPPLY — Mt. Pleasant, Mich.
TILLSONBURG PIPE & SUPPLY CO. — Tillsonburg, Ont.

BUCYRUS ERIE — SOUTH MILWAUKEE, WISCONSIN

Bump that assures positive results

When fire strikes, seconds count . . . your fire extinguishers must be the right type and function properly from the very start . . . failure means serious losses.

The growing popularity of the highly effective powdered dry chemical fire extinguishing agent may be hampered by a drawback . . . settling or packing can occur after a lapse of time. However, with C-O-TWO Dry Chemical Type Fire Extinguishers there's no chance of this happening.

The exclusive inverting and bumping design of C-O-TWO Dry Chemical Type Fire Extinguishers provides mechanical breakage of the dry chemical by shifting its position in the cylinder. This outstanding mechanical breakage, plus continuous inert gas pressured agitation or fluffing of the skillfully blended free flowing dry chemical, guarantee lasting, foolproof fire protection.

No other brand on the market today gives you this extra margin for positive results. Inverting and bumping is only one of many unique design advantages that make C-O-TWO Dry Chemical Type Fire Extinguishers your best buy for killing flammable liquid and electrical fires, as well as surface fires involving ordinary combustible materials.

With C-O-TWO Dry Chemical Type Fire Extinguishers the heat-shielding dry chemical is a non-conducting, non-abrasive, non-toxic, finely pulverized powder compound . . . blankets fire instantly. Sizes range all the way from 4 to 150 pounds capacity . . . all fully approved by the Underwriters' Laboratories, Inc., Factory Mutual Laboratories and Government Bureaus.

Act now for complete free information on these top quality, sure-acting fire extinguishers. Remember fire doesn't wait . . . get the facts today!

C-O-TWO

MANUFACTURERS OF APPROVED FIRE PROTECTION EQUIPMENT

Squeez-Grip Carbon Dioxide Type Fire Extinguishers
Dry Chemical Type Fire Extinguishers
Built-In High Pressure and Low Pressure Carbon Dioxide Type Fire Extinguishing Systems
Built-In Smoke and Heat Fire Detecting Systems

C-O-TWO FIRE EQUIPMENT COMPANY
NEWARK 1 • NEW JERSEY

C-O-TWO FIRE EQUIPMENT OF CANADA, LTD. • TORONTO 8 • ONTARIO

Sales and Service in the Principal Cities of United States and Canada

AFFILIATED WITH PYRENE MANUFACTURING COMPANY

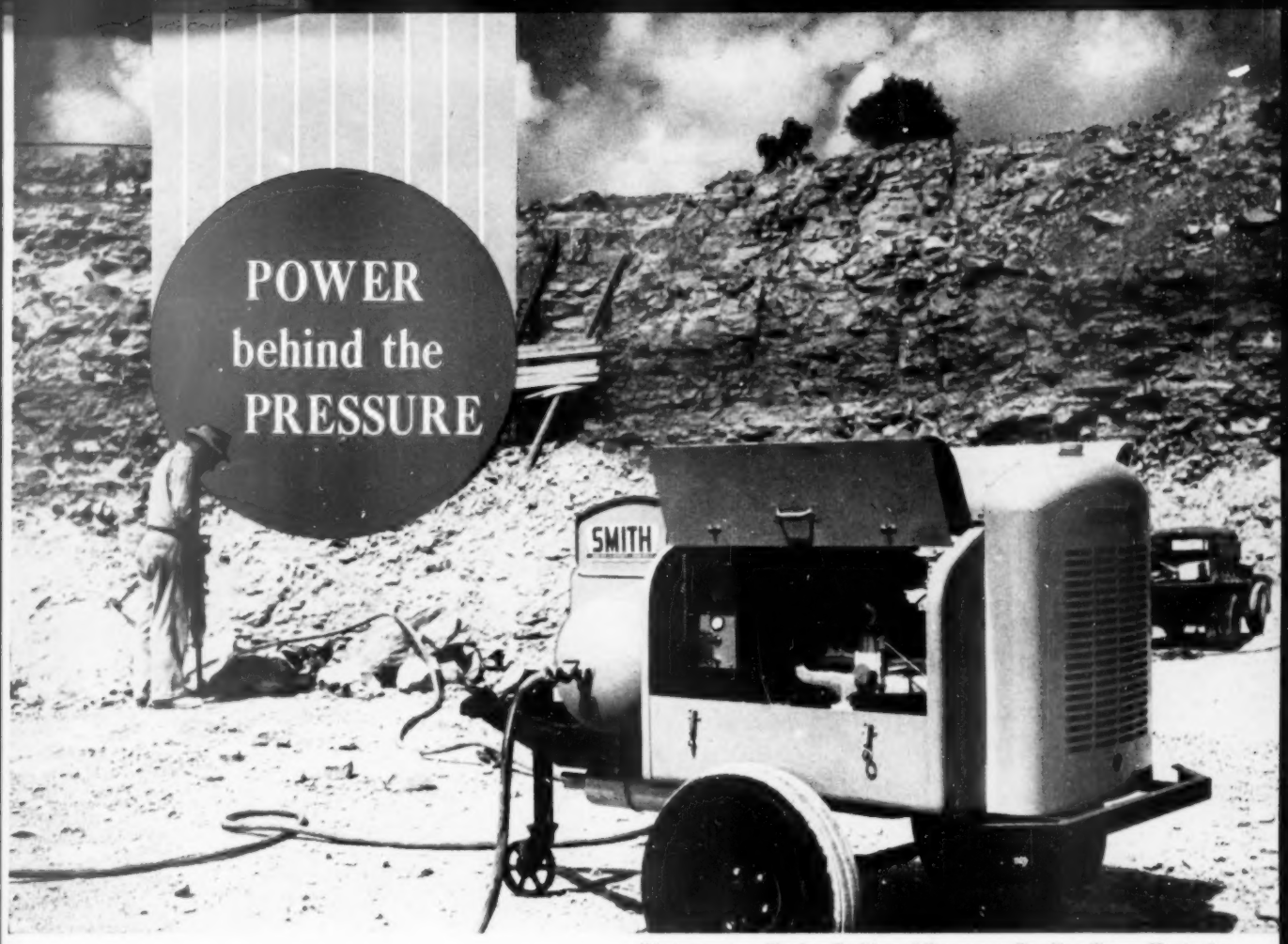
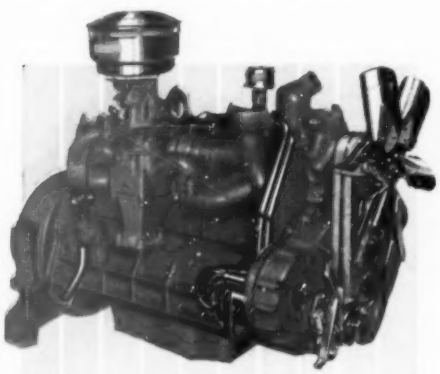


Photo courtesy Gordon Smith and Company, Bowling Green, Kentucky

air...120 cubic feet per minute...with Chrysler–modern industrial power



Here's Pedigreed Horsepower in another role . . . this time it's the Chrysler Industrial Model 22 Engine whose 413 cubic inches displacement is powering an air compressor. The air compressor, in turn, is operating a rock drill with which holes are being prepared for blasting. Fifty-five pound rock drills, two eighty pound paving breakers, two eighty pound sheeting drivers, four backfill tampers, two concrete vibrators . . . they're all "duck soup" to this Air Compressor.

The outstanding power to weight ratios of Chrysler Industrial Engines make them ideal power plants for light, compact, portable equipment like this Gordon Smith Air Compressor. The total weight of this entire unit is below the weight of the power plant alone in some air compressors.

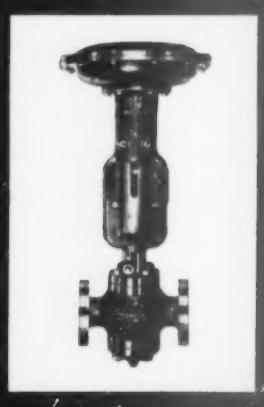
Greater power per pound weight, longer service with less maintenance . . . these are important advantages of Chrysler Industrial Power. Another is your ability to select Chrysler Engines equipped to your needs *without* substantial increase in the unit costs of engines. That's because Chrysler production-line methods adapted to specialized industrial engine building, provide custom-built engines at mass-production prices.

Chrysler Industrial Engine sales and service facilities are nationwide. Let the nearest dealer show you what Chrysler Power can do for you, or write: ***Dept. 1510, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER
Industrial Engines

HORSEPOWER WITH A PEDIGREE

• for safe, easy stem lubrication



The isolating valve in the stem lubricator of the Honeywell Series 700 Valve affords maximum safety against leakage when replenishing stem lubricant . . . tight-fitting conical plug and machined seat assure leakless shut-off . . . pinned bonnet prevents accidental removal. The Honeywell Series 700 wide band proportional valve comes in a full range of styles and sizes . . . has *all* the features you look for in a fine valve. Write today for your copy of Bulletin 700-2.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1906 Windrim Avenue, Philadelphia 44, Pa.

MINNEAPOLIS
Honeywell
VALVE PRODUCTS

H HONEYWELL

First in Controls

Highly specialized process controls are used to produce the finest in seamless WELDING FITTINGS

Only Globe, among manufacturers of welding fittings, produces its own seamless steel tubes. Specialized processes at every stage of manufacture from billet to tube — to fitting — insure uniform high quality. Thorough inspection and continuous laboratory control guarantee strict conformity to rigid specifications.

Now . . . you can get these high-quality fittings when you need them — in the quantities you want. Just get in touch with your nearest Globe distributor.

GLOBE STEEL TUBES CO., Milwaukee 46, Wisconsin
Chicago • Cleveland • Detroit • New York • Philadelphia • St. Louis
Denver • Houston • San Francisco • Glendale, Cal.

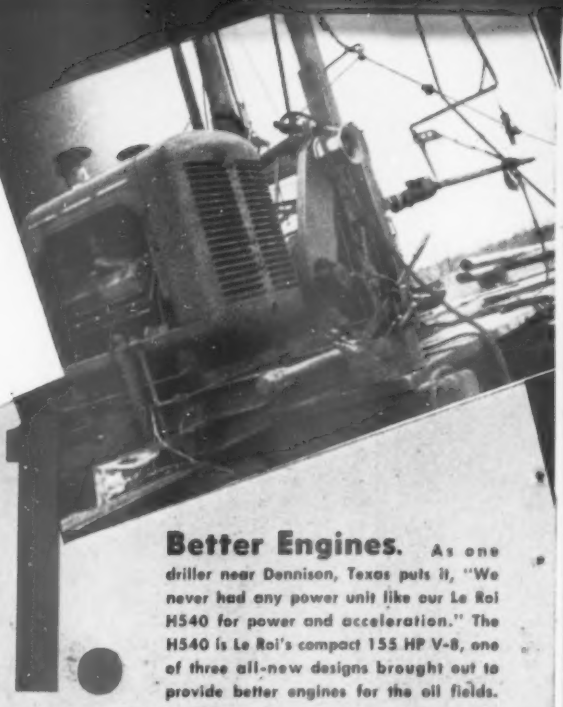
Producers of Globe Welding Fittings — Globe seamless stainless steel tubes — alloy — carbon seamless steel tubes — Gloweld welded stainless steel tubes — Globeiron (high purity ingot iron) seamless tubes.

Here is one of the highly specialized manufacturing operations that insure Globe quality — piercing the billet to form a seamless tube.

AVAILABLE IN A COMPLETE LINE OF SIZES AND WEIGHTS THROUGH GLOBE DISTRIBUTORS IN ALL KEY CITIES

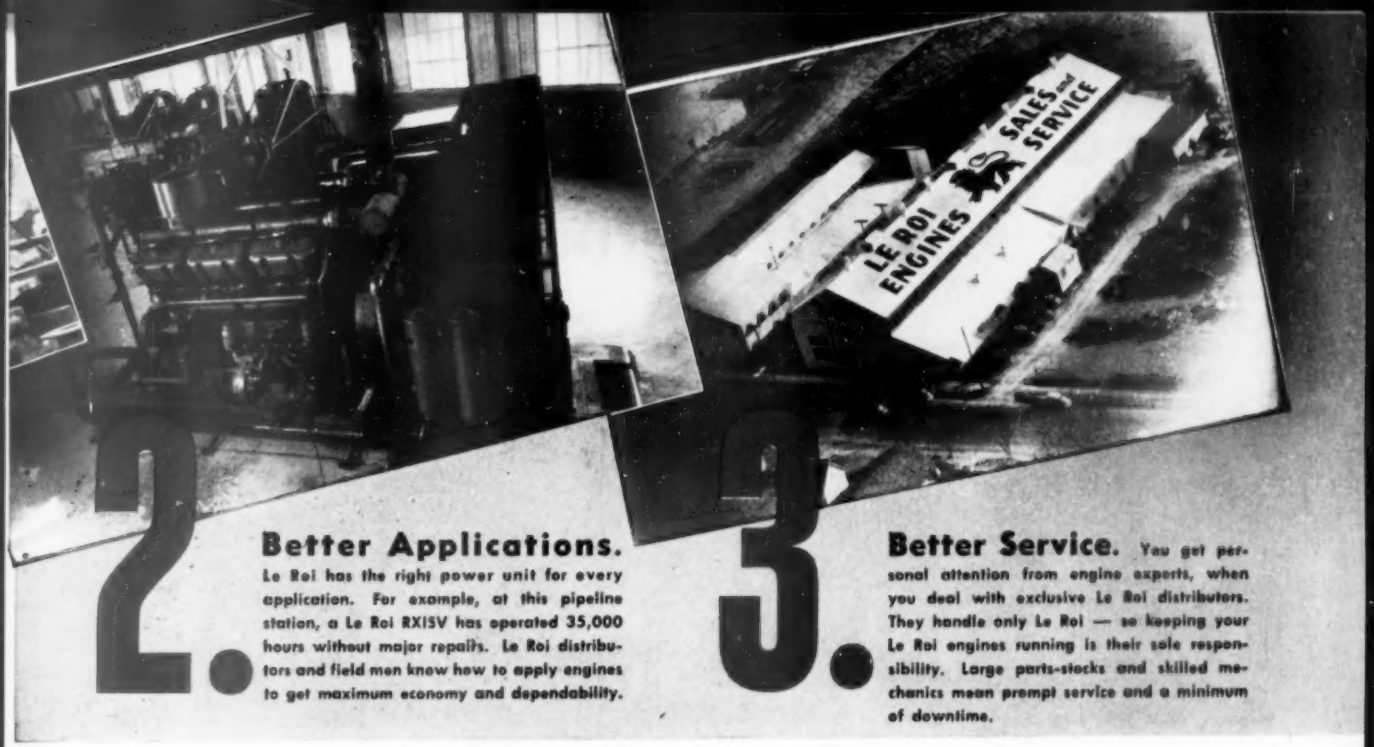
Send for the Globe Welding Fittings catalog.

Le Roi 3 way Partnership



Better Engines. As one driller near Dennison, Texas puts it, "We never had any power unit like our Le Roi H540 for power and acceleration." The H540 is Le Roi's compact 155 HP V-8, one of three all-new designs brought out to provide better engines for the oil fields.

13,300′ in 122



2. Better Applications. Le Roi has the right power unit for every application. For example, at this pipeline station, a Le Roi RXISV has operated 35,000 hours without major repairs. Le Roi distributors and field men know how to apply engines to get maximum economy and dependability.

3. Better Service. You get personal attention from engine experts, when you deal with exclusive Le Roi distributors. They handle only Le Roi — so keeping your Le Roi engines running is their sole responsibility. Large parts-stocks and skilled mechanics mean prompt service and a minimum of downtime.

days! { with only two Le Roi L 3000's

Hall-Stewart's two-engine Le Roi L3000 rig has more than the 1950 drilling-depth record in West Texas to its credit. The Midland, Texas drilling contractor says this about his Le Roi's:

"We're now drilling our sixth 13,000-foot well. That's hard work on any engine, but we think our Le Roi's are 'just getting broken in'.

"We find that Le Roi L3000's are faster on acceleration — and have more pep — than slower, in-line engines.

"Ever since we've had our first Le Roi engine, service from General Machine & Supply Co. (West Texas Le Roi distributor) has been excellent. Their overhaul work is superior to any other shop. And they get a man out faster, when we need him.

"Repairs cost less, too. We figure 25% less for overhaul than with other engines."

Le Roi drilling engines range from 155 to 600 max. hp. They operate on abundant, low-cost oil-field fuels — natural gas or butane — and can be switched from one to another in an instant.

On original equipment or as replacement engines, Le Roi power puts you ahead of the field. Contact your nearby distributor or Le Roi Oil Field Headquarters for details of Le Roi's 3-way Partnership.

LE ROI COMPANY

MILWAUKEE 14, WISCONSIN

Plants: Milwaukee • Cleveland • Greenwich, Ohio

Oil Field Headquarters: Tulsa, Oklahoma

A Subsidiary of Westinghouse Air Brake Co.

See these Le Roi Distributors for a Profitable 3-way Partnership or contact your favorite supply house

Oklahoma
Le Roi Company Branch — Tulsa.
Carson Machine & Supply Co. — Oklahoma City.

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply Co. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co. — Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend.

Illinois — Western Kentucky
Western Machinery & Engine Company — Centralia, Illinois and St. Louis, Missouri.

Michigan
Hafer Engine Service — Reed City.

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

Mississippi, Arkansas and Northern Louisiana
Ingersoll Corporation — Shreveport, Louisiana, El Dorado, Arkansas, and Clarksdale, Jackson, Mississippi.

West Coast
Le Roi Engine Sales Co. — Long Beach, California.

Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lucey Export Ltd. — Calgary, Edmonton, Alberta.

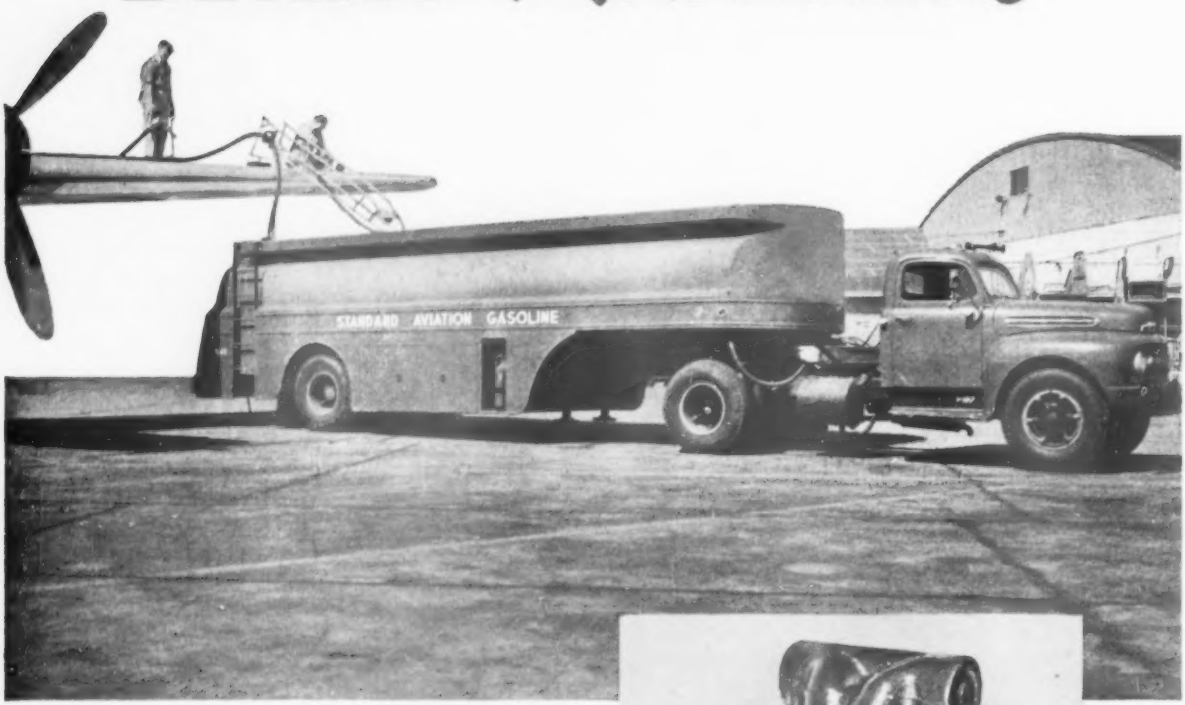
P-115

A Typical Le Roi Service Facility

Here's an efficient well-arranged parts department. Le Roi has service facilities like these throughout the oil fields—another reason why you get prompt 24-hour service, why you can depend on Le Roi.

Standard Oil Company's Newest, Safest Aircraft Refueler is using

BERRY *Rotodraulic*



To better service today's larger multi-engined airplanes and overcome the fire hazard of gasoline engines, Standard Oil (Kentucky) designed a new kind of aircraft tender.

In a Berry hydraulic transmission, driven by power-takeoff, a new and safer way was found to drive the gasoline pump.

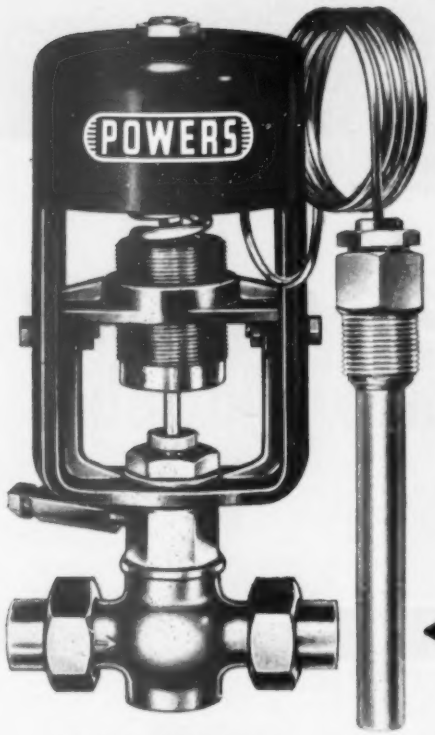
The hydraulically driven gasoline pump can deliver 300 gallons per minute from each hose. Hydraulic power operates a governor, permitting the driver to accelerate the engine from idle to desired speed with a button on the hose nozzle.

The small size, rugged construction, quiet operation and long, maintenance-free life of the Berry unit made it the ideal solution.

Berry may be able to solve your pump or transmission problem, too. For full details, call your nearest Berry representative. Or write us for a catalog.

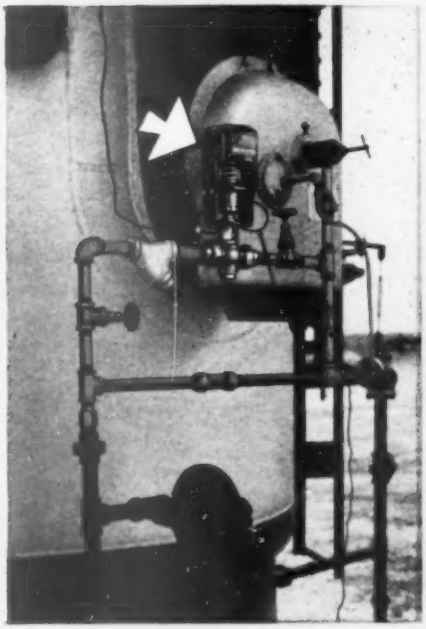
BERRY DIVISION ROTARY PUMPS **OLIVER Iron and Steel Corporation**
PITTSBURGH 3 · PENNSYLVANIA

Applied to
4' x 10' INDIRECT HEATER



SIMPLE • DEPENDABLE
ECONOMICAL

POWERS No. 11-OFT Self-Operating TEMPERATURE REGULATOR



Applied to
An EMULSION TREATER

Want BETTER Control

for Field Processing Equipment?

POWERS TEMPERATURE
No. 11-OFT Self-Operating
REGULATORS

give dependable trouble-free service in all kinds of weather. Note these features:

1) Thermal system has OVER-heat protection. Powerful two-ply bellows and single seat composition disc valve assures tight shut off.

2) Valve stem lubricator helps give closer control, reduces packing gland troubles.

3) Rugged, built for long reliable service in all kinds of weather. Operate efficiently down to 60° F. below zero.

4) Durable Valves are direct acting, have single seat bronze body with double unions, for easy installation, composition disc and stainless steel seat.

5) Temperature adjustment range: 110 to 190° F., other ranges between 30 to 370° F.

6) Bulb Well is cadmium plated steel and extra heavy plain capillary tubing is 10 ft. long.

Powers No. 11 Regulators are backed by over 60 years experience making *SELF-OPERATING* controls. They are used by leading manufacturers of heaters and treaters.

Simplify Your Control Problems—Standardize on Powers

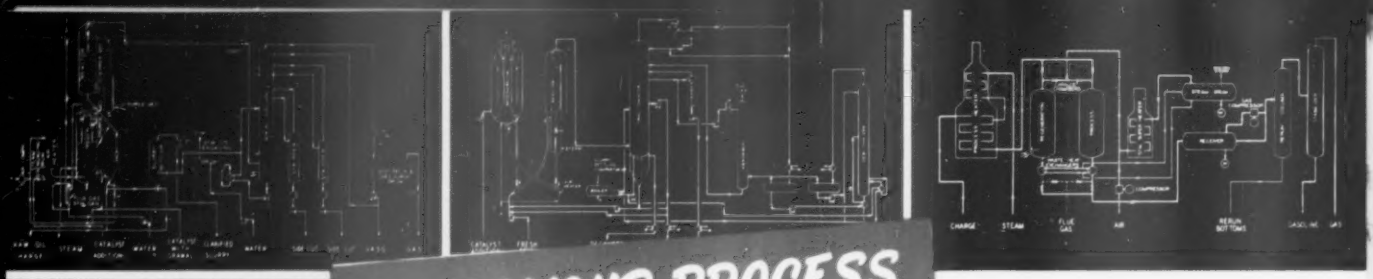
(h25)

POWERS CONTROL

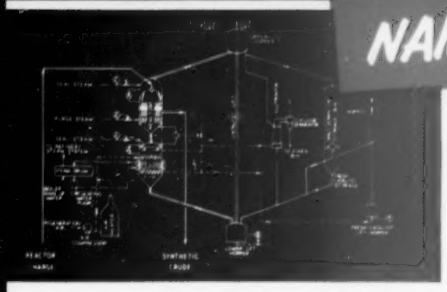
THE POWERS REGULATOR COMPANY

SKOKIE, ILLINOIS • Offices in Over 50 Cities In U. S. A., CANADA and MEXICO
See Your Telephone Directory

OVER 60 YEARS OF AUTOMATIC TEMPERATURE CONTROL



NAME YOUR PROCESS



National Tube can supply the right pipe and tubes

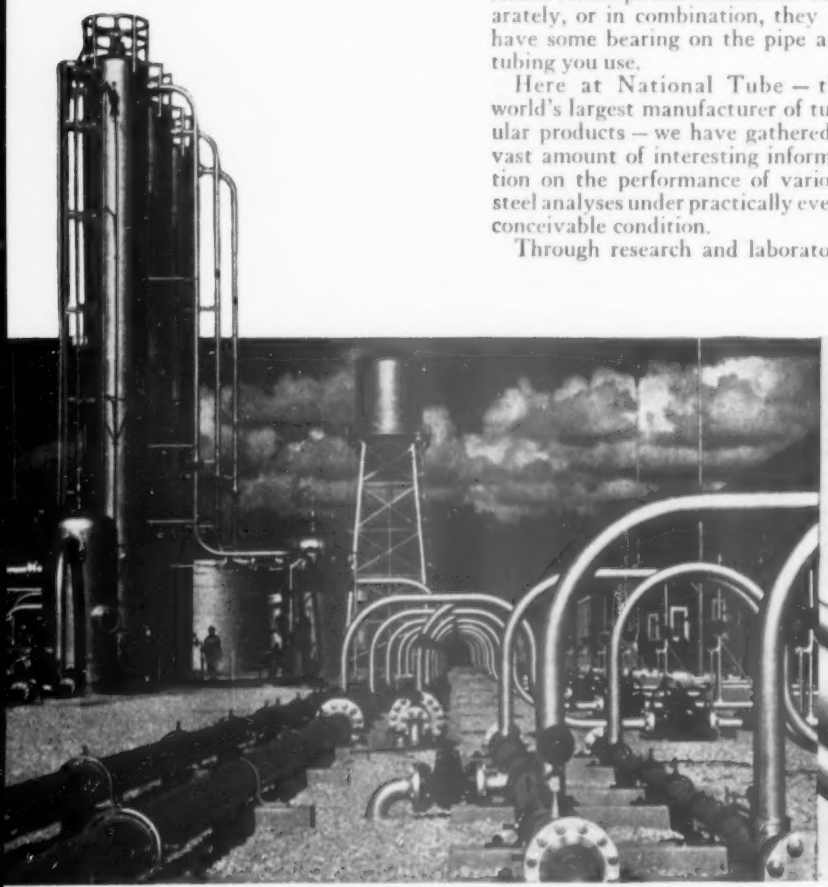
IN THE NUMEROUS TECHNIQUES employed in modern refining processes, pipe and tubing plays an essential and often widely diversified role. That is why the 24 *different* analyses which we can offer in National Seamless Pipe and Tubes are so important.

MANY considerations enter into the selection of refinery pipe and tubes. Different processes. Different production techniques. Temperatures. Pressures. Corrosives. Acids. Atmospheric conditions. Separately, or in combination, they all have some bearing on the pipe and tubing you use.

Here at National Tube — the world's largest manufacturer of tubular products — we have gathered a vast amount of interesting information on the performance of various steel analyses under practically every conceivable condition.

Through research and laboratory experiments; through on-the-scene observations; and by studying actual installations with the men in charge, we have developed 24 different analyses of Still Tubes, Condenser and Heat Exchanger Tubes, and Refinery Piping.

That's why we say: *bring your problems to National Tube.* If conditions at your plant are new to our engineers, you can be sure that we will not make a recommendation without first satisfying ourselves that we have come up with the right analyses for your particular requirements. An inquiry entails no obligation on your part.



NATIONAL TUBE offers you Seamless Steel Still Tubes . . . Condenser Tubes . . . Heat Exchanger Tubes . . . Refinery Piping . . . in 24 DIFFERENT ANALYSES

Carbon	2 Cr, ½ Mo	5 Cr, ½ Mo
Carbon, ½ Mo	2¼ Cr, 1 Mo	5 Cr, ½ Mo, 1½ Si
½ Cr, ½ Mo	2½ Cr, ½ Mo, ¾ Si	5 Cr, ½ Mo, Ti
1 Cr, ½ Mo	3 Cr, 1 Mo	7 Cr, ½ Mo
1¼ Cr, ½ Mo		8 Cr, ½ Mo
		8 Cr, 1 Mo
		9 Cr, 1 Mo
		12 Cr, Al
		17 Cr
		27 Cr
		18-8
		18-8 Ti
		18-8 Cb
		18-8 Mo
		25-20

All National Seamless Tubes are pierced from a solid billet of high-quality steel. This is the one method that removes all doubt concerning uniform wall strength.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

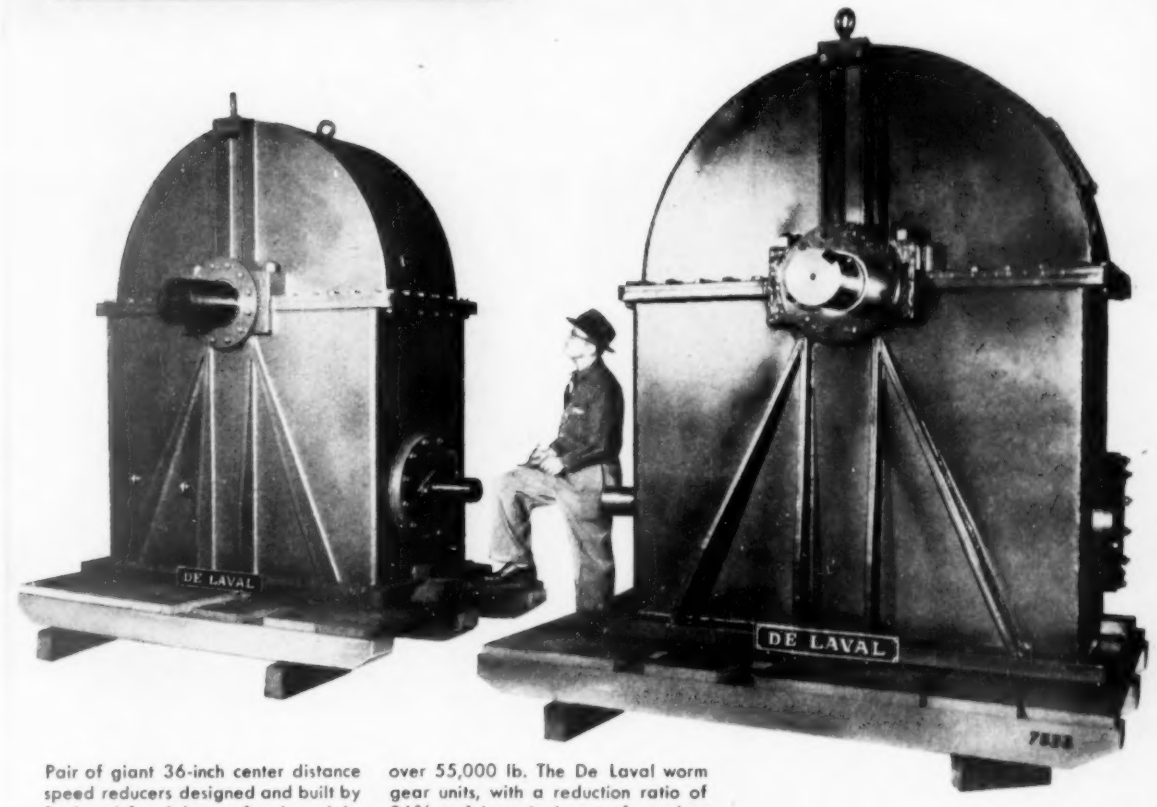
COLUMBIA GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S NATIONAL SEAMLESS PIPE AND TUBES

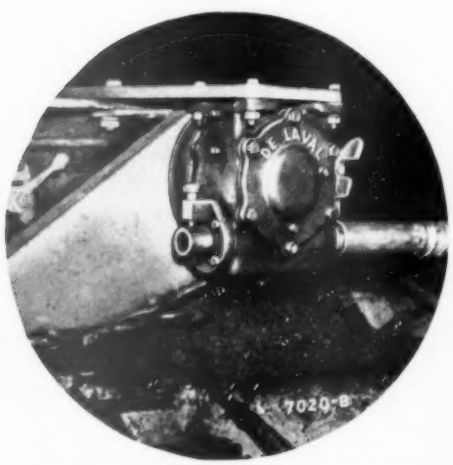
UNITED STATES STEEL

DE LAVAL
SPEED REDUCERS

from dwarf to giant size



Pair of giant 36-inch center distance speed reducers designed and built by De Laval for slab transfers in a slabbing-blooming mill. These slab transfers are used to convey steel slabs up to 12 in. thick and 42 in. wide, weighing over 55,000 lb. The De Laval worm gear units, with a reduction ratio of 26⅔ to 1 in a single set of gearing, are each driven by a 200 hp, 410 rpm motor coupled directly to the input shafts of the slab transfers.



Here's one of the smaller De Laval worm gear speed reducers with a 3″ center distance being used for a new coal drilling machine.

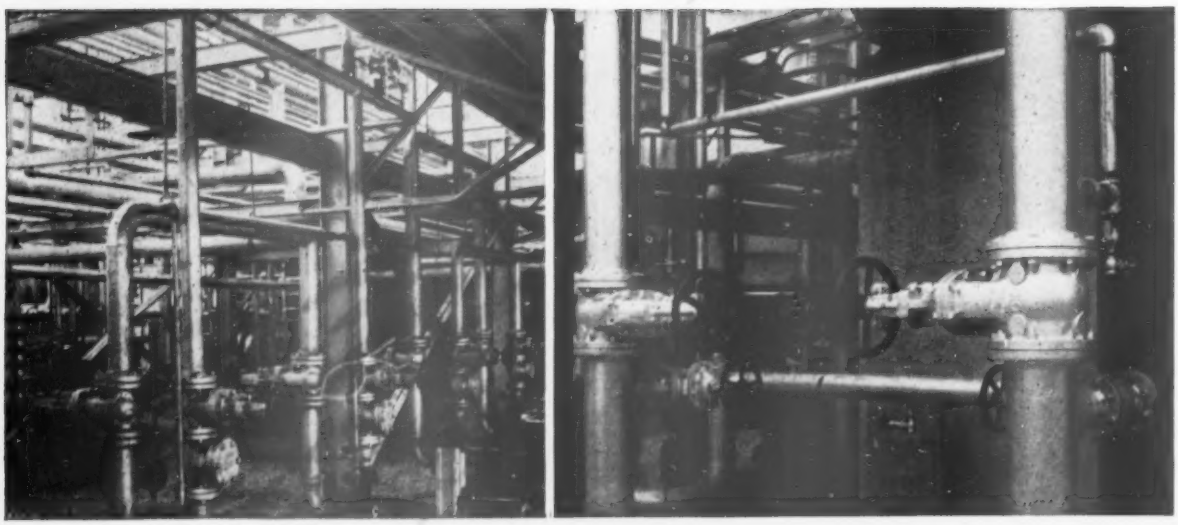
De Laval heavy-duty worm gear speed reducers seldom require attention under the most rugged operating conditions. They make a quiet, close-couple compact drive. They permit high ratio reductions in a minimum of space and withstand severe shock loads without damage. De Laval builds all sizes from 3″ to 36″ center distances for transmission ratios of 3.1:1 to 100:1 in single reduction units and ratios of 50:1 to 8000:1 in double reduction units. Whether you need dwarf or giant worm gearing, consult De Laval for engineering assistance. *Send for De Laval Manuals G-W BV and G-W W H containing data on single and double reduction units.*

DE LAVAL *Speed Reducers*

DE LAVAL STEAM TURBINE COMPANY

810 Nottingham Way, Trenton 2, New Jersey DL-210

Oh, I see



...they're using our valves at Derby Oil...

This modern piping system indicates the need for proper flow control in a process plant. Valve dependability, efficiency and long service are essential. Derby Oil, like so many others, relies on OIC Valves because they're precisely engineered . . . manufactured to rigid specifications.

Write for catalog information or engineering assistance.

THE OHIO INJECTOR COMPANY • WADSWORTH, OHIO

OIC FOUNDED 1883

VALVES | FORGED & CAST STEEL, IRON & BRONZE, LUBRICATED PLUG VALVES

Original and Genuine

RIDGID

HEAVY-DUTY PIPE WRENCH

Read this guarantee —on millions of RIDGID wrenches sold to date.

1st with guaranteed housing— still the only one!

UNCONDITIONAL GUARANTEE

If this Housing ever Breaks or Distorts we will replace it Free.

COPR. 1937
THE RIDGE TOOL CO.
ELYRIA, O.

1st *with replaceable jaws*—non-slip, non-lock, instant grip on pipe.

1st *with adjusting nut in open housing*—always spins easily to pipe size, 6" to 60".

1st *with handy pipe scale* on hookjaw.

1st *with comfort-grip I-beam handle*—with handy hang-up hole.

1st *with end pattern pipe wrench*—for pipes crowded or against flat surfaces.

No wonder RIDGID is the world's most popular pipe wrench. Buy genuine RIDGID's for easier work and extra economy—at your supply house.

THE RIDGE TOOL COMPANY, ELYRIA, OHIO, U. S. A.

RIDGID

Work-Saver Pipe Tools ·· Most Popular in the World

HYATT BEARINGS DIVISION, GENERAL MOTORS CORPORATION

YATT BARREL BEARING

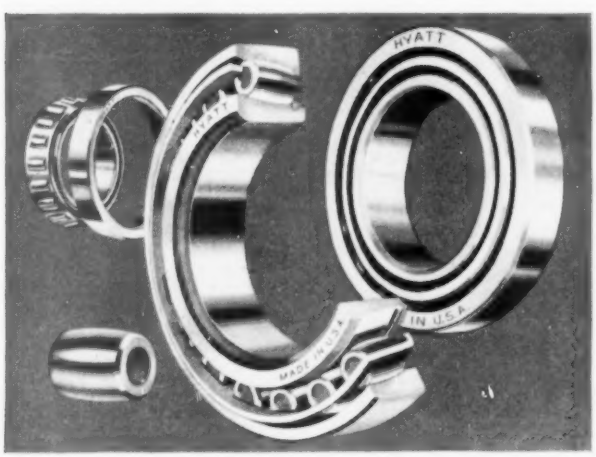
now available

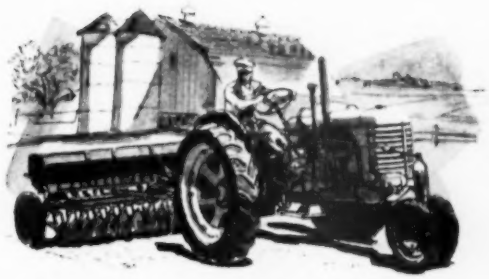
in volume!

Hyatt is rolling out the barrels! . . . and a familiar shape is giving a big lift to modern industry! A new Barrel Bearing —pioneered and perfected by Hyatt—is available in volume for the first time! There's no other bearing quite like it—and it's ready for a starring role in industrial production!

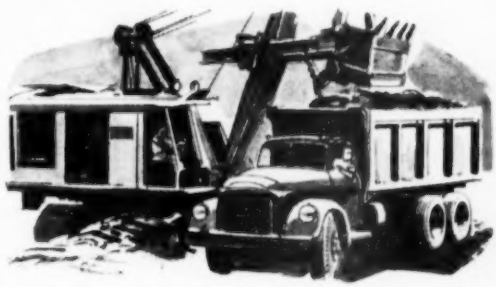
The Barrel name comes from the barrel shape of the rollers . . . but its superiority in bearing applications comes from *dual-purpose design* and *self-aligning ability!* This unique bearing takes load from any direction . . . and operates at full load-carrying capacity under conditions of misalignment! And in addition, the barrel shape of the rollers combines the low rolling friction of a ball with the high load capacity of a cylindrical roller—so that the Barrel Bearing is ideal for a wide range of applications.

Expensive? *Not at all!* Advanced manufacturing processes —plus the facilities of one of the newest and finest bearing plants in the world—make the initial cost far lower than you would expect! . . . For full information on this newest solution to the friction problem, write to the address below.

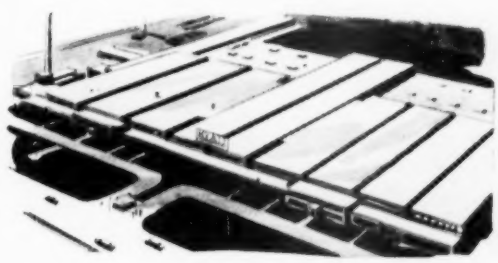




Self-aligning action makes the Barrel Bearing ideal for tractors and farm implements. Over many years, its durable, dependable performance has been established in a wide range of these applications.



In trucks and construction equipment, too, Hyatt's Barrel Bearing operates with full efficiency under conditions of heavy, multiple-direction loading. Unique roller and race design distributes the load over large areas of contact.



Hyatt's new plant, in Clark Township, N. J., is among the most modern in the world. New equipment makes possible advanced manufacturing processes, and research facilities are the finest in the bearing industry.

YATT ROLLER BEARINGS

HARRISON, NEW JERSEY

We Insist on the BEST!

From Precision Roller Bearings, High Strength Cast Iron, and Tough Alloy Steel, to the final coat of paint, our inspectors and metallurgists keep a constant vigil to make doubly sure that only the FINEST MATERIALS go into the manufacture of . . .

LUFKIN

Quality Products

SEE OUR CATALOG IN THE COMPOSITE CATALOG

Lufkin **FOUNDRY & MACHINE COMPANY**

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COREXIT

Reduces sucker rod failures

SAVES HUNDREDS OF DOLLARS

Corexit builds a protective coating

Corexit is a patented compound that gradually builds up a protective coating inside the tubing and on sucker rods in sour crude wells to prevent corrosion. Tests show that where corrosion has already started, Corexit is effective in checking further corrosion.

Combats hydrogen embrittlement

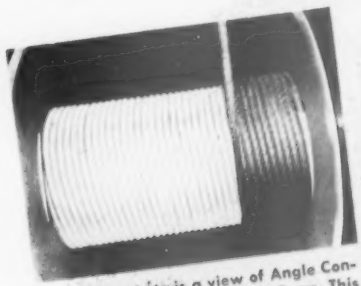
In sour crude wells, many sucker rod failures are caused by hydrogen embrittlement. Corexit coats corroded spots on old sucker rods and prevents the entrance of additional atomic hydrogen. On new sucker rods, Corexit combats hydrogen embrittlement. Write for further information today.

HUMBLE

HUMBLE OIL & REFINING COMPANY P. O. BOX 2180 • HOUSTON, TEXAS

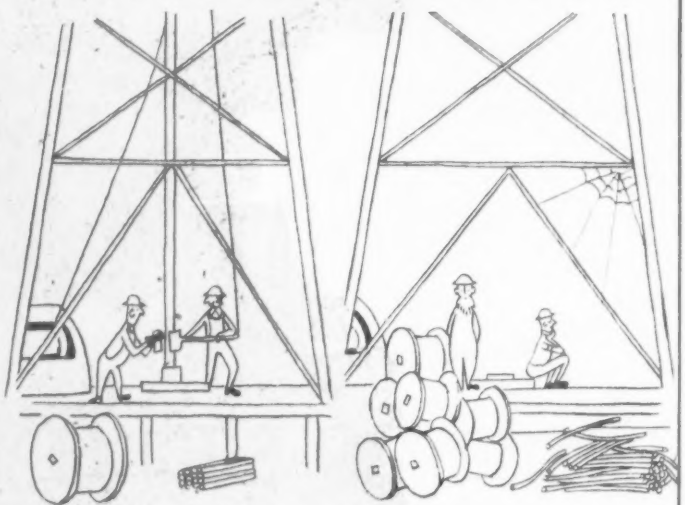
PAGES FROM THE LEBUS WIRE LINE SPOOLING HANDBOOK

LeBus Grooving and Controlled Pyramid Spooling*



The above photo is a view of Angle Control Section of LeBus Grooved Drum. This illustrates the load being picked up with only 8 to 15 wraps of line on drum, requiring 100' to 200' less wire line in spooling system. Below is photo showing third layer of line being wrapped on parallel section to further illustrate PROGRESSIVE SPOOLING.

Saves Time and Wire Line



Using the LeBus Grooving and Controlled Pyramid Spooling System* *SO THAT THE LINE WILL AUTOMATICALLY SPOOL PROPERLY WILL OFTEN PAY FOR ITSELF IN TIME AND LINE SAVED WHILE USING UP 5,000 FEET OF WIRE LINE OR LESS.* 100 to 200 feet less line is needed in the LeBus spooling system because the operator uses only 8 to 15 wraps of line on the drum core when the pipe load is picked up from the rotary table while coming out of the hole. The LeBus System will also save valuable time in line handling during the move forward and/or drum end cutting off procedure. Drilling crews using plain drums lose a great deal of time because of the difficulty and time required for hand spooling the line after each drum end cut off. In many cases the rig operators have to lay the traveling block, hooks, and elevators down several times after each cut off to respool the line by hand and try to make it spool properly. *This is definitely not the case with a LeBus Grooved Drum.* Remember, time saved in your line handling is bonus time gained for drilling bit to be rotated on the bottom of the hole.

LEBUS INTERNATIONAL ENGINEERS LIMITED

Executive Offices: 305 Wichita Natl. Bank Bldg., WICHITA FALLS, TEXAS
SALES, SERVICE Control and Warehouse Stock: LONGVIEW, TEXAS

COMPLETE SALES & SERVICE IN EVERY OIL CENTER

*Patented and Other Patents Pending

CONGRATULATIONS, CONTRACTORS!

Le Roi Company salutes the American Association of Oilwell Drilling Contractors and its president, F. W. Brigance, for an outstanding record of accomplishment

You're doing a magnificent job! Drilling more than 90% of all wells completed annually is a real contribution to the economy of our country. It's a tribute to the progress and efficiency of the contract-drilling business — to the tremendous strides you have made in the art of drilling.

We at Le Roi are proud to work side by side with you, in keeping pace with the growing demand for petroleum products.

May your thirteenth annual meeting in Denver be the best ever!

F. W. BRIGANCE
President
American Association of Oilwell Drilling Contractors

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.
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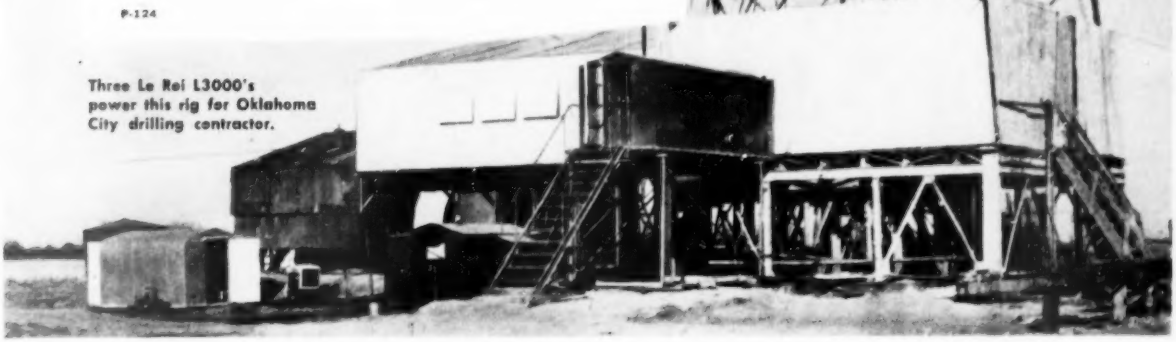
Canada
LUCEY EXPORT LTD. — Calgary, Edmonton, Alberta.

P-124



Three Le Roi L3000's power this rig for Oklahoma City drilling contractor.

"RED" WILLETT UNLOADS 4½ MILLION LBS. OF PIPE IN 31 HRS. WITH A LORAIN

CRANE BREAKS KNOWN RECORDS ON BARGE UNLOADING OPERATION

MONROE, LA. — What is believed to be a pipe handling record was set by a 20-ton Lorain Moto-Crane, Model MC-414, owned by J. O. "Red" Willett, unloading 16" and 20" pipe from barges to trucks. The pipe is for the 525 mile Southern Natural Gas pipeline contract running from Louisiana to Tennessee. Each section of pipe is 40 ft. long, weighing an average 2900 lbs. The Lorain Moto-Crane works as many as 24 hours per day on many varied pipeline operations.

You will find mobile Moto-Cranes all along the right of way, quickly converting from crane to clamshell or dragline when on-the-spot excavation is required. Powerful tractive effort of the available 6-wheel drive and big-tire flotation make it possible for Lorain Moto-Cranes to move into rough terrain and over steep grades — wherever the pipeline may go. "Red" Willett has seven good reasons for buying his latest, high-speed Moto-Crane — all of them Lorains he has bought in the past.

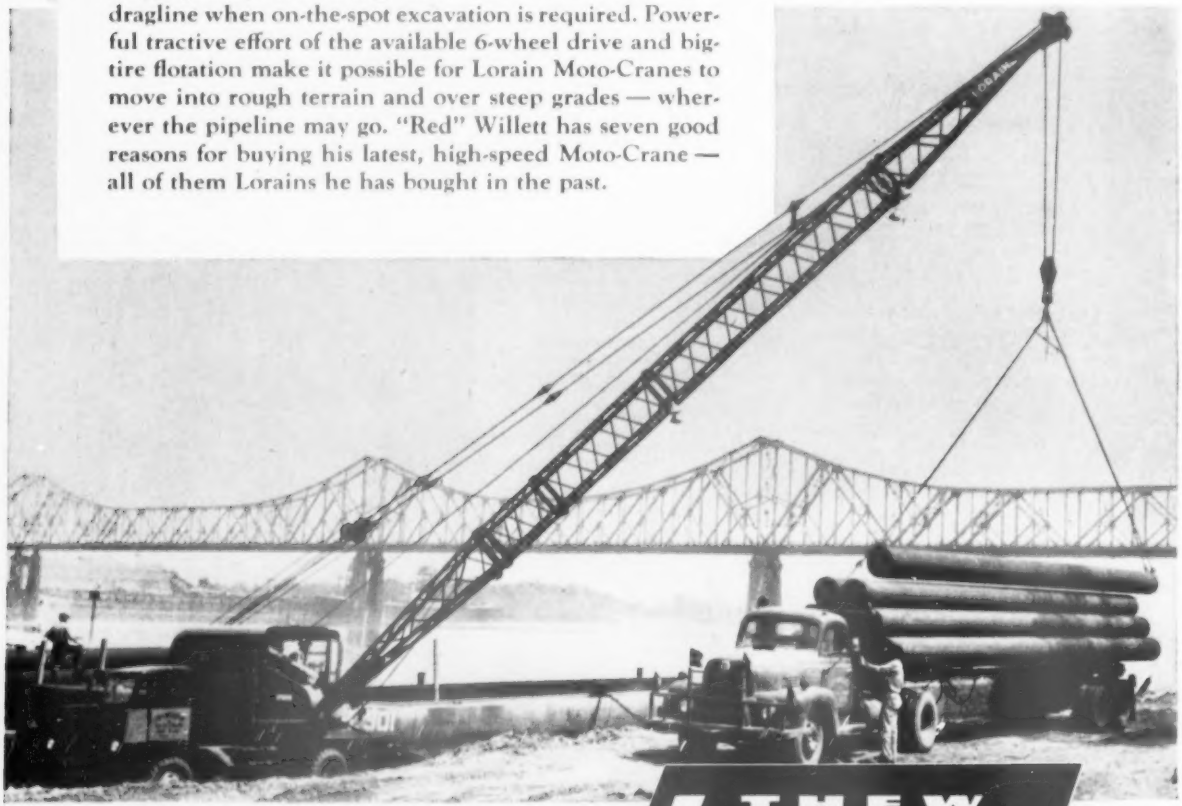
LORAINS

on the pipelines

offer these important, money-saving advantages. Check with your nearby Thew-Lorain Distributor — get facts about Lorains.

- Handle many jobs — ditching, pipe-stringing, unloading operations. Lorain convertability to shovel, crane, clamshell, dragline or hoe adds to profitable uses — lowers investment.
- Select from crawler or rubber-tire types — to fit terrain and travel needs — in crane capacities up to 45 tons, as shovels up to the 2-yard class.
- Get pipeline features — for pipeline work. Lorains embody many special operating and design features for most efficient pipeline duty.

THE THEW SHOVEL CO.
Lorain, Ohio



PUT YOUR NAME ON A **THEW LORAIN**®

Why all Emsco pumping units use TIMKEN® bearings in their gear boxes

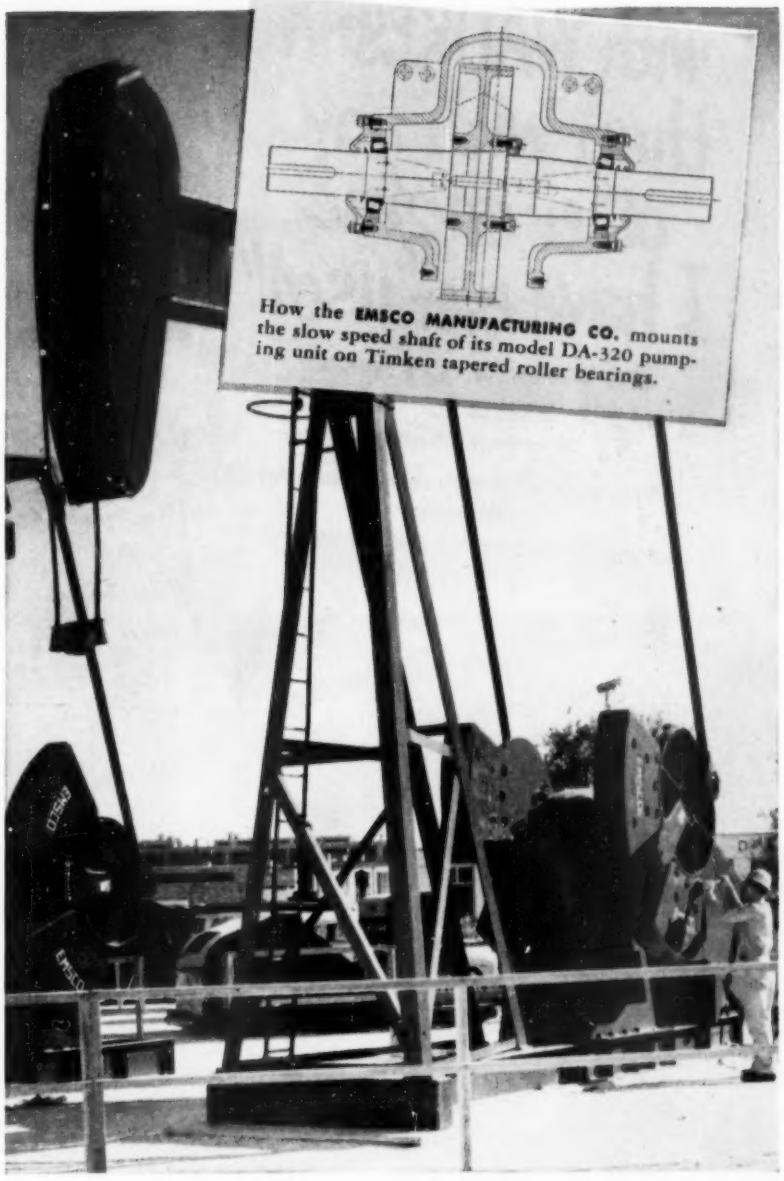
TO get bearings that combine precision with rugged dependability, Emsco put the slow speed shafts on its entire line of pumping units on Timken® tapered roller bearings.

Since herringbone gears are used, the Timken bearings on the slow speed shaft must locate all of the other shafts. Timken bearings take the radial loads from the slow speed gear and from the overhung cranks. Their tapered design lets them take *both* radial and thrust loads in any combination. They minimize end-play and deflection, hold shafts in proper alignment, reduce gear wear.

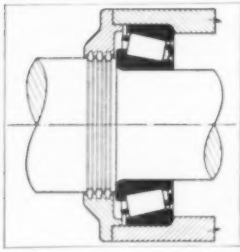
Timken bearings hold housings and shafts concentric making closures more effective. Lubricant stays in—dirt and moisture stay out. Lubrication costs are held to a minimum.

Be sure to specify Timken bearings in all the oil field equipment you build or buy. Look for the trade-mark "Timken" stamped on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian Plant: St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How the **EMSCO MANUFACTURING CO.** mounts the slow speed shaft of its model DA-320 pumping unit on Timken tapered roller bearings.



LUBRICANT STAYS IN —DIRT KEPT OUT

Because Timken bearings hold shafts concentric with housings, closures are made more effective. Lubricant is retained, dirt and moisture kept out.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis Timken steels.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

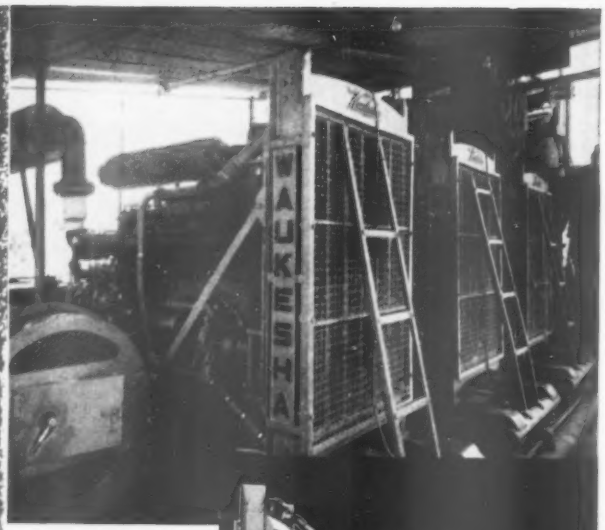
TAPERED ROLLER BEARINGS

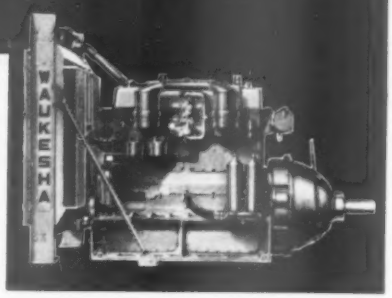
NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↓ AND THRUST →◎← LOADS OR ANY COMBINATION

"Less down time with WAUKESHA than with any other engine I have ever used"

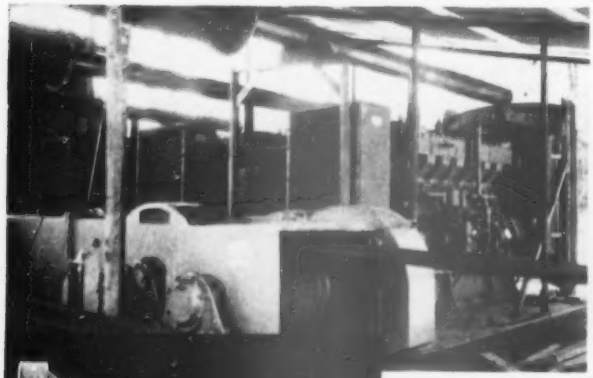
Nick Wheless, Jr., Vice President
WHELESS DRILLING COMPANY*
Shreveport, Louisiana

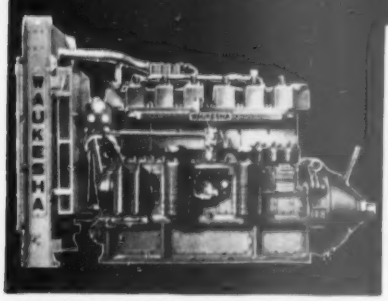
*Operators of 7 Waukesha-powered drilling rigs



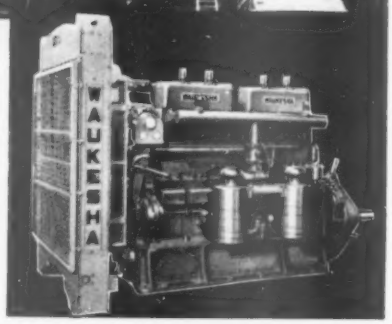


Emsco J 750 rig, Wheless owned and operated. Three **6-NKRU Waukesha Gas Units** 7 x 8¼ bore and stroke, 1905 cu. in. displ. Get Bulletin 1558.





National 80 rig, Wheless owned and operated. Three **6-LROU Waukesha Units** (1600 Series T. D. Converters) 8½ x 8½ bore and stroke, 2894 cu. in. displ. Get Bulletin 1560.



Emsco J 1250 rig, Wheless owned and operated. Three **6-LRZU Waukesha Gas Units** 9⅜ x 8½ bore and stroke, 3520 cu. in. displ. Get Bulletin 1481.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

WAUKESHA

Diesel **OIL FIELD POWER** *Gas*

219

Lay sour crude pipe with 62% less labor cost

Easy-handling Tenite pipe means substantial installation economies. In a typical case, three men laid 4000 feet of 4" Tenite pipe a day; eight men are usually required to handle the same amount of steel pipe.

Extruded of Eastman cellulose acetate butyrate plastic, Tenite pipe does not corrode under oil-field conditions. Major oil producers are successfully using it for sour crudes, salt water disposal, and in areas where electrolytic action affects steel pipe.

Because of the extra smooth walls of Tenite pipe, paraffin clogging is minimized. Some Tenite lines have been in service more than 3 years in an area where paraffin had to be cleaned from steel pipe every few days. For any given head loss, Tenite pipe also delivers approximately 40% more fluid than does clean steel pipe of the same diameter.

Pipe extruded of Tenite is made by various companies to which Eastman supplies the plastic compound. Send the coupon for further information about Tenite plastic pipe. If you need assistance in adapting Tenite pipe to your operation, our technical staff will be glad to help.

For corrosion resistance ask for PIPE MADE OF—

TENITE

an Eastman Plastic

EASTMAN CHEMICAL PRODUCTS, INC.
KINGSPORT, TENNESSEE

Sales representative for
TENNESSEE EASTMAN COMPANY
Division of Eastman Kodak Company

EASTMAN CHEMICAL PRODUCTS, INC.
DEPT. 1, KINGSPORT, TENNESSEE

Please send me further information about TENITE PLASTIC PIPE

NAME.....

TITLE.....

COMPANY.....

STREET.....

CITY.....STATE.....

LOADING — High reverse speeds and power-boosted steering make these "PAYLOADERS" big producers on loading work . . . have dumping height to load big trucks.

DIGGING — Sump pits, drilling sites and other grading and excavating tasks are regular assignments for 4-wheel-drive "PAYLOADERS" . . . are driven quickly to the job.

BACKFILLING — The regular bucket is widely used for fast backfilling work, but this blade attachment is also available.

CARRYING — This Crane Hook is one of several attachments that greatly multiply "PAYLOADER" usefulness.

MASTER OF MANY JOBS

Big 4-wheel-drive "PAYLOADERS" are proving their value and versatility in the oil industry as they have in so many others. They're multi-purpose handymen for the pipe liner, the driller and refiner . . . can excavate, load trucks and backfill trenches . . . build fire walls, grade and spread . . . pull, push, lift and carry. These outstanding tractor-shovels have four speeds in reverse as well as forward, ranging from a powerful 2 M.P.H. crawl up to 27 M.P.H. transport speed.

They've got power-boosted steering . . . full hydraulic fingertip bucket control . . . automatic tip-back bucket motion . . . unsurpassed operator visibility. And there's a choice of gasoline or diesel power up to 90 H.P. Once you've seen a "PAYLOADER" in action, you'll realize what they can do on *your* jobs. See your "PAYLOADER" Distributor today or write The Frank G. Hough Co., 749 Sunnyside Ave., Libertyville, Illinois.

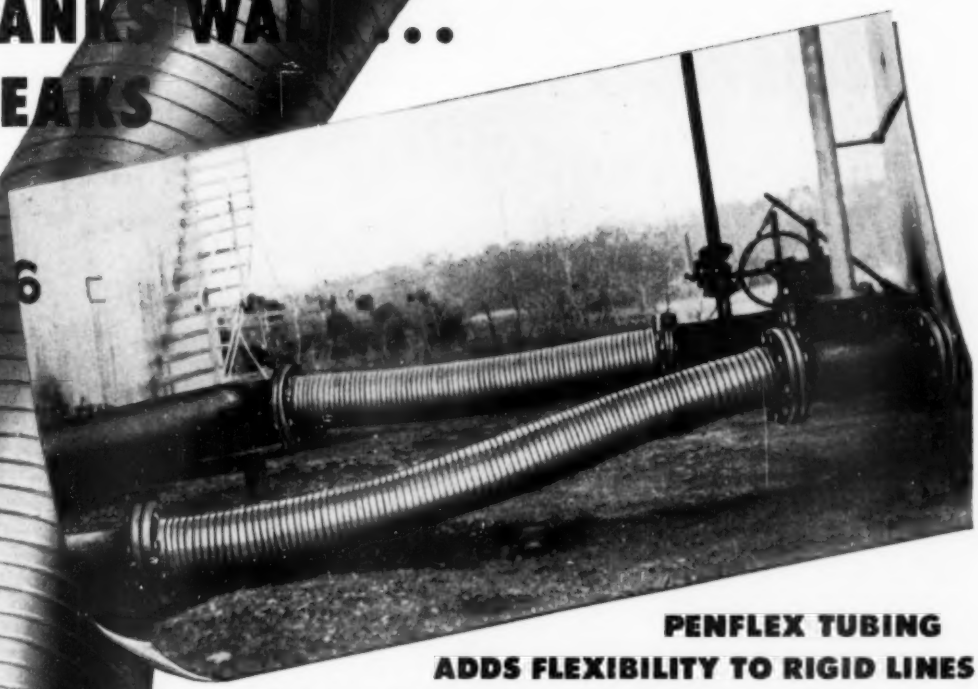
WRITE for full information on any of the "PAYLOADER" models: FourWheel Drive HM — 1½ yd. and HR — 1 yd.; Rear Wheel Drive Models HY — 1¼ yd., HF — ¾ yd., HE — ½ yd.; Front wheel drive Models HAH — 15 cu. ft., HA — 12 cu. ft.

SAY "HUFF"

PAYLOADER®

THE FRANK G. HOUGH CO. SINCE 1920

LETS TANKS WA... NO BREAKS



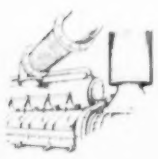
PENFLEX TUBING ADDS FLEXIBILITY TO RIGID LINES

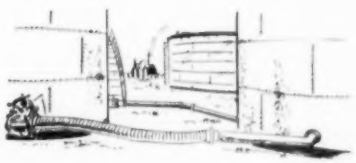
Large storage tanks must move with the heat or cold. Rigid connections on one installation were constantly breaking. Flammable liquids leaked out . . . a fire hazard was created, material lost and maintenance costs rose.

The answer was a length of 12" I.D. Penflex four-wall interlocked flexible tubing installed with tight-packed flanges. Tanks can now "walk" with the weather, tubing is tight as a pipe and no special supports were necessary for installation.

In the petroleum or the chemical industries wherever the conveying of liquids, gases or granular materials for storage tanks, engines, compressors or other types of equipment is necessary with flexibility you'll find Penflex "Flexineering" has the answer. Penflex manufactures a complete line of four-wall interlocked and seamless welded corrugated flexible tubing . . . metallic hose, tubing or couplings from 1/8" I.D. and up . . . automatic barrel fillers, accessories and fittings.

Pennsylvania Flexible Metallic Tubing Company, Inc., 7213 Powers Lane, Phila. 42, Pa.
Branch Sales Offices: **Boston • New York • Chicago • Houston • Cleveland • Los Angeles**





PENFLEX

HEART OF INDUSTRY'S LIFE LINES

Engineered to Out-Perform

...and BUILT TO LAST

• CONTINENTAL •
RED SEAL POWER

HD-260 DIESEL OPEN POWER UNIT. 59 BARE ENGINE HORSEPOWER @ 2000 R.P.M.

For more than 50 years, Continental has been engineering power plants to do more useful work per pound of engine weight, and building them to run longer with less time out for repairs. You do more work, at lower fuel and upkeep cost, with dependable Red Seal power. And the range of the Red Seal line—more than 100 basic models, Diesel and gasoline—assures a power plant for every job.

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Specify and standardize on Yellow Strand oilfield lines for all your oilfield jobs.

There's a tough Yellow Strand line for every task . . . for every need. Every line has been designed with characteristics that absorb snapping starts and stops, work smoothly at high speeds, safely handle heavy strings. They have the stamina to last 'til deep pay zones are reached.

And you get Yellow Strand lines *when* you need them. Conveniently-located and well-stocked, Broderick & Bascom plants and warehouses back Continental Stores to assure prompt delivery whenever and wherever you work.

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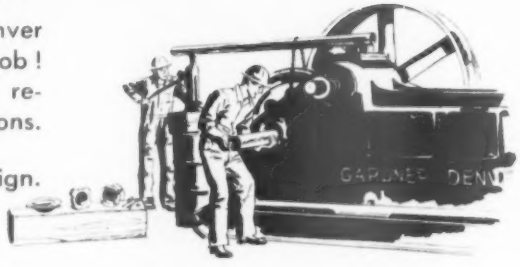
GARDNER-DENVER MUD PUMPS

are never obsolete!

9 out of 10 started in 1935 are still in use!*

Illustrated is a typical example . . . Gardner-Denver Mud Pump delivered in 1935 and still on the job! During its' past 18 years of service all parts replacements were made on the drilling locations.

Every replacement part has been of latest design.



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*Names, locations and histories of all are available.

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for your toughest heat exchange problems

CUPRO NICKEL, 30%-702, is the best and most widely used copper alloy for tubes in refinery heat exchangers operating under the severest conditions—where corrosive materials and cooling waters must be handled at relatively high temperatures and pressures.

In refinery heat exchanger equipment, tubes of Cupro Nickel, 30%-702, retain strength at relatively high operating temperatures and are resistant to stress-corrosion cracking. The alloy has the property of forming protective films of corrosion products, making it particularly desirable for service where sea water, even at relatively high velocities, is used for cooling.

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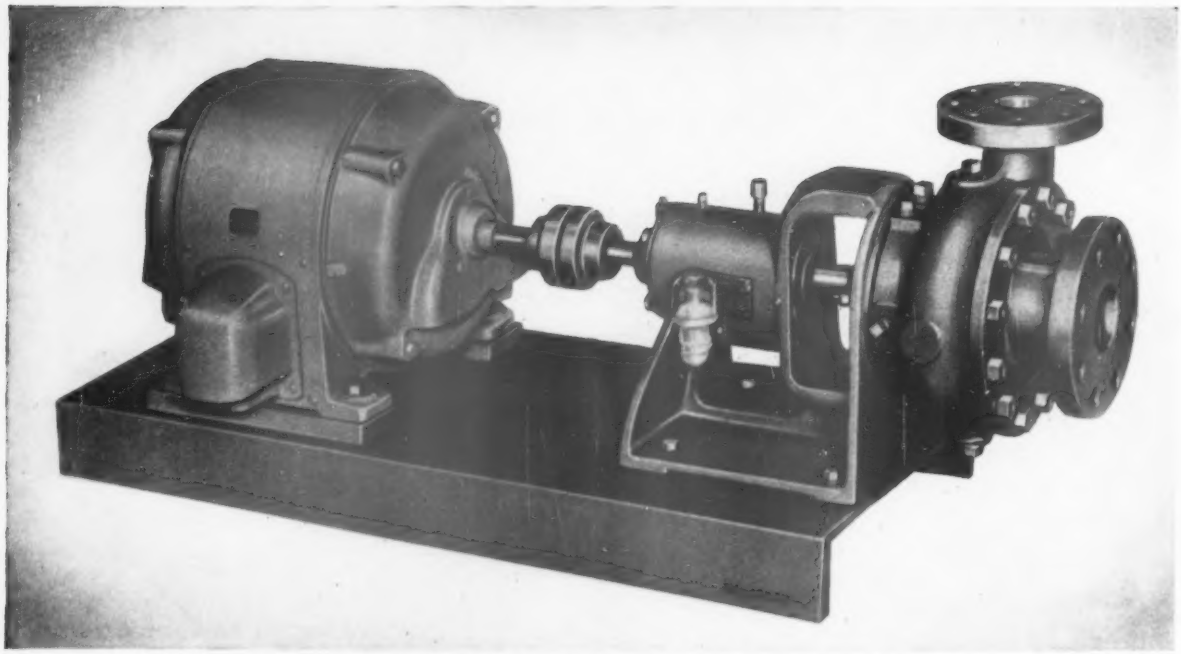
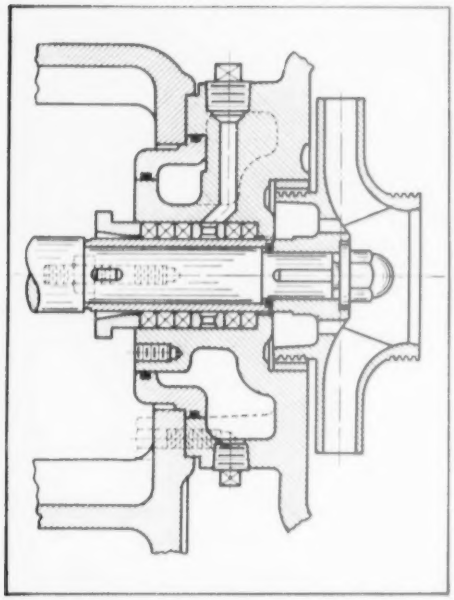


THE NEW WORTHINGTON TYPE CNR CENTRIFUGAL PUMP is designed to give dependable, trouble-free performance on a wide variety of refinery jobs.



WATER-COOLED STUFFING BOX provides longer life for packing and bearings. Cross-sectional view shows water-jacketing.

Here's another Worthington pump that makes refinery operations more efficient

It's our compact, single-stage Type CNR centrifugal pump, built to handle such refinery jobs as treating, blending, loading and transfer.

Here are some of the features of the modern CNR centrifugals:

1. HEAVY CASINGS in iron or steel for extra wear under high pressure and corrosive conditions.

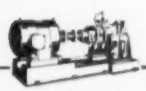
2. WATER-COOLED STUFFING BOXES with conventional packing or mechanical seals optional.

3. HEAVY-DUTY CONSTRUCTION with 250-pound ASA flanges (150-pound in steel) for really rugged service.

4. INTERCHANGEABILITY. The CNR is part of our SESC pump line. That means complete interchangeability of any pump component for easier servicing, broader range of pump selection and greater availability.

You can get the new CNR's in capacities up to 2700 gpm, to handle temperatures up to 350° F.

Write for Bulletin W341-B16 to Worthington Corporation, Centrifugal Pump Division, Harrison, New Jersey. C 3.9



Types HR and HB. Twenty sizes. Capacities up to 1,800 gpm. Developed heads up to 900 ft. Proper selection of material permits use for temperatures far below zero to 800° F. for pressures from high vacuum to 750 psig.

Type HD. Hydraulically-balanced double-suction impeller handles boiling liquids with low submergence. Capacities range from 600 to 3,200 gpm at heads up to 700 ft. To 850 F and 550 psig.

Type CNE. For loading or transfer service. Capacities to 2,700 gpm. Heads to 500 ft.

Type HM. Available in 12 sizes. Capacities to 700 gpm. Heads to 475 ft. Up to 500 F.

WORTHINGTON

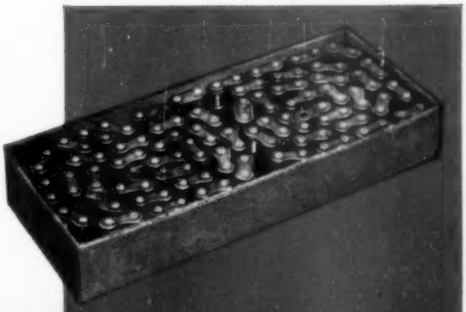
Centrifugal Pumps

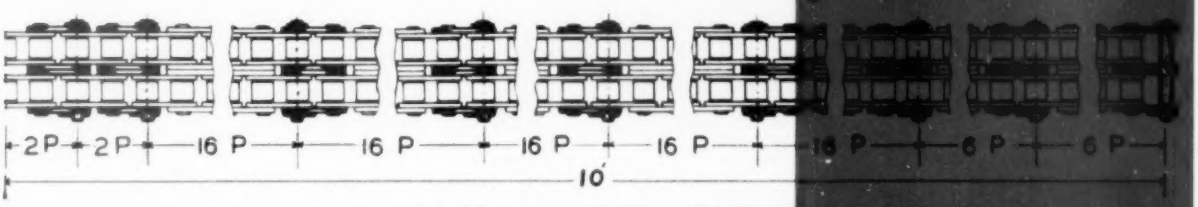
The World's Broadest Line Assures You the Right Pump for Every Job

Now it's Even Easier!

TO MAKE UP THE EXACT LENGTH OF CHAIN YOU NEED WITH IMPROVED BALDWIN ASSEMBLY RIVETED ROLLER CHAIN

The original Baldwin Assembly ("BA") Riveted Roller Chain completely eliminated old-fashioned, time-consuming, temper-trying, expensive chain cutting, while giving the user all the longer lived advantages of riveted chain. Now, with *Improved* Baldwin Assembly, chain coupling, uncoupling and repairs are faster, easier, less expensive than ever before.

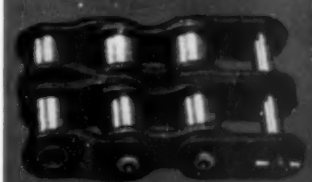




No. 100 Baldwin Assembly Riveted Roller Chain

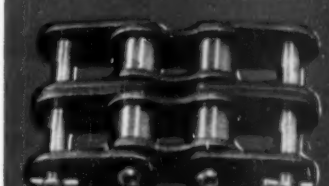
You buy Baldwin Assembly in a packaged unit—a 10-foot strand in every box. Each strand contains a number of conveniently located coupler links at which points the chain can be quickly and easily taken apart. (The location of the coupler links varies slightly for each chain size.) By combining two or more of the sections in the basic 10-foot length, any length of chain required can be made up in the shortest possible time. What's more, there's no danger of damaging chain parts while doing it. If more than 10 feet of chain is needed, just buy an extra box.

SPECIAL PURPOSE SECTIONS



A 3-Pitch Riveted Offset Section

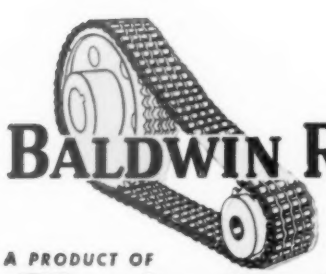
This unit consists of an offset link and a coupler link riveted to a roller link. Use it for any drive requiring an odd number of pitches. We recommend this section instead of a single offset link because the riveted construction increases structural rigidity and durability.



A 3-Pitch Repair Section

This unit consists of two coupler links riveted to a roller link. When one or two links are accidentally damaged, it is often economical to repair the damage with a 3-pitch repair section rather than replace a longer section.

Get all the facts on why the Improved Baldwin Assembly is better than ever. See your local supply store or write for Bulletin 52-3. Chain Belt Company, 4619 W. Greenfield Ave., Milwaukee 1, Wis.



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OIL IN DRILLING FLUIDS DOESN'T BOTHER HYCALOGGERS...

. . . For Hycaloggers, with the experience of logging over 800 wells, have solved this problem. Their researchers in the Hycalog laboratories have produced the answer—a special technique which cleans cuttings thoroughly without affecting their composition, permitting full evaluation even when drilling fluids contain oil.

May we show you how Hycalogging* gives you the whole story on formations, under any drilling conditions.

**Hycalogging is continuous hydro-carbon logging of cuttings, mud samples, and recovered cores.*

WELL LOGGING
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*Only Carlon**

FOR LEASE PRODUCTION PIPING

CARLON Plastic Pipe is the answer to longer service life for lead lines, gun barrel mounts, siphon lines, and salt water disposal piping. CARLON resists corrosion! It is completely inert to the effects of salt water, crude oil, sour crude, and corrosive earth as well as rot, rust and electrolytic action. The smooth interior walls of CARLON Plastic Pipe prevent accumulation of paraffin, scale and sediment and remain clean throughout the installation period.

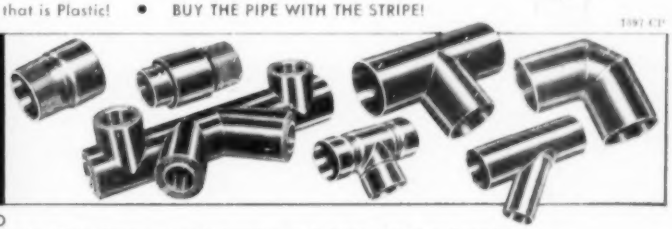
CARLON Plastic Pipe weighs only 1/8th as much as steel and can be easily handled by one man. The long lengths can be cut with a saw or sharp knife, permitting sections to be easily removed and reused elsewhere if desired. Attachments to metallic lines are made quickly and efficiently with plastic fittings.

Write today for literature!

* The First REAL PIPE that is Plastic! • BUY THE PIPE WITH THE STRIPE!

CARLON PRODUCTS CORPORATION

Pioneers in Plastic Pipe



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CARLON plastic pipe is produced in Texas, Colorado, Ohio, Oregon, North Carolina and Acton, Ontario, Canada.

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NEW MEXICO

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When a rig goes "down", every minute costs you money. Hundreds of operators have found the best way to cut expensive downtime to a minimum is by calling a nearby Iverson Supply Store. Fully-stocked Iverson stores operate 'round the clock, 24 hours a day, so that you can have that badly needed piece of equipment in the shortest time possible. Deliveries are quickly made even to out of the way locations.

Iverson service is fast but it's friendly too. Most operators enjoy this pleasant teamwork. For fast and friendly service for drilling, production or refinery equipment, call your Iverson Supply Store.

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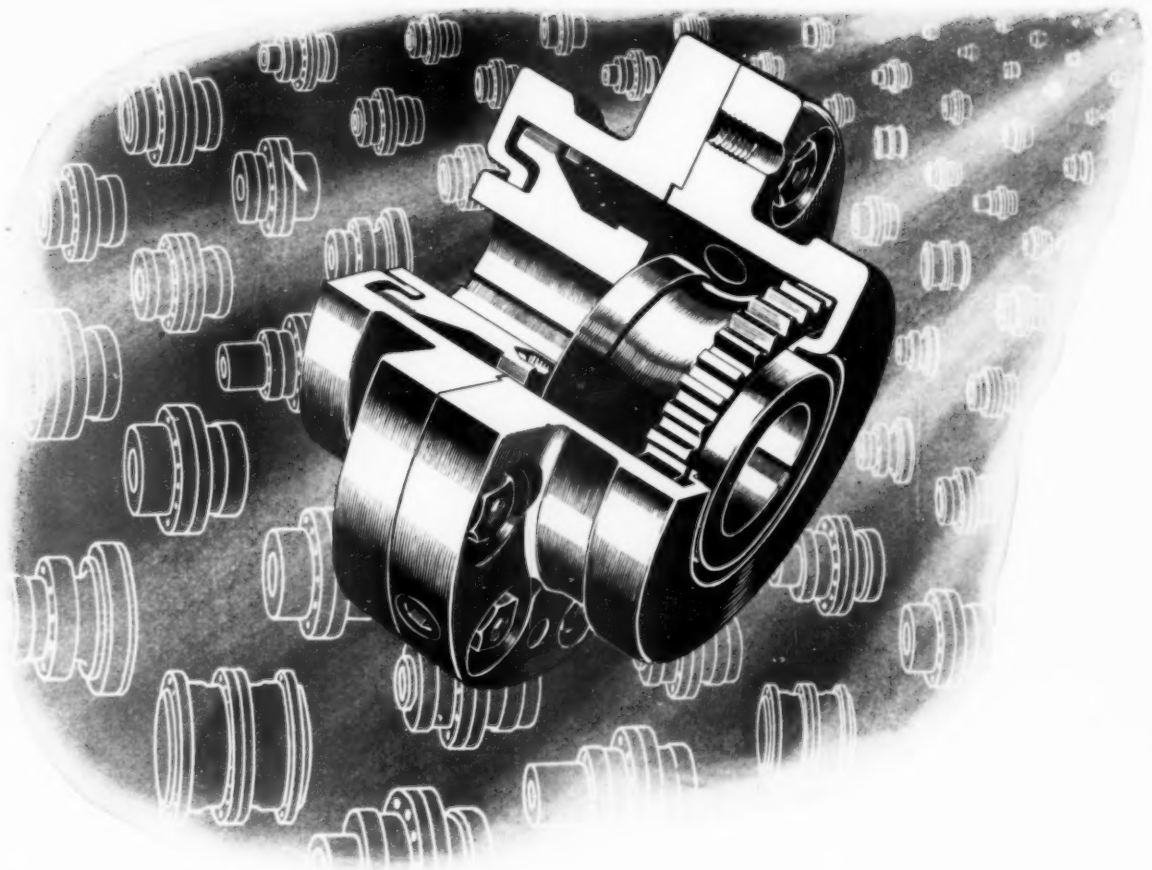

Hundreds of thousands of installations prove . . .

FAST'S Couplings are FIRST!

There's no stronger endorsement of Fast's Couplings than the close to three-quarter million Couplings installed in the 33 years since their design revolutionized the power coupling business!

Trouble-free performance that saves down-time, maintenance, and money led to that record. And, whatever your coupling applications, it's a guarantee of what *you* can expect from Fast's! Fast's Couplings give you *rugged construction* . . . because their original design has been maintained without basic change or sacrifice in size or materials. Fast's Couplings give you *lowest cost per year* . . . because they usually outlast the equipment they connect. And Fast's Couplings give you the benefit of Koppers *free engineering service* . . . assuring you of the right coupling for any job and the right solutions to tough coupling problems.

Write today for full details to KOPPERS COMPANY, INC., *Fast's Coupling Dept.*, 380 Scott St., Baltimore 3, Maryland.

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Flying "taxis" that open up new roads

Miraculous rescue flights over Korean combat zones put helicopters in the spotlight. Soon, 'copters like these three leaders will open up more and more new "roads" in America's skies.

Powered by always dependable, air-cooled engines built by Lycoming, these helicopters are already used by industry as flying "taxis" to transport executives from plant to plant. Soon, major cities will get aerocab service from midtown terminals to airport flight lines. Later, every state in the union will get super "taxi" service between cities . . . and even commuter service from suburbs to hearts of business sections.

Dependable Lycoming power has helped these leading helicopters achieve outstanding safety records. This is another Lycoming contribution to America's progress in the air; another reason why we say: "For efficient, dependable, air-cooled power . . . look to Lycoming!"

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Lycoming Spencer Division, Williamsport, Pa. — AVCO — Bridgeport Lycoming Division, Stratford, Conn.

*Wright Cyclone engine, built by Lycoming under license from Curtiss Wright Corporation, Wright Aeronautical Division.

"I don't see how we ever did business without RCA 2-Way Radio"

—says L. H. MOORE of Moutray-Moore Drilling Co., Inc. and Moore & Moore Drilling Co.

"As a control mechanism, our RCA Fleetfone equipment in my home, the home of our drilling superintendent shop, office, 6 rigs and 10 cars, keeps us informed as to the activities in West Central Texas for which we are responsible and assures us that our plans and policies are being carried out according to schedule," says Lamar H. Moore.

"Oilfield equipment has to be tough to stand up to the treatment it must receive, so, when we bought 2-way radio we selected RCA as the radio best suited to our requirements," says Mr. Moore.

"For all-round coverage, for operation under tough field conditions, we chose RCA Fleetfone Radio. And it has measured up in every way. Rough roads and back country give equipment a gruelling workout every day in the week. RCA 2-way radio is the one that proved it can take it."

RCA 2-Way Radio increases efficiency

"RCA 2-Way Radio has increased our efficiency in drilling operations," concludes Mr. Moore. "Efficiency in service rendered to the operator is a must to a drilling contractor. Two-way radio has enabled us, by giving direct contact with the rigs, to obtain a peak of efficiency which we never dreamed possible."

In everyday routine contacts . . . in emergencies . . . RCA 2-way radio can help make your job easier—can help you cut your costs. Investigate RCA 2-way radio. **MAIL COUPON.**

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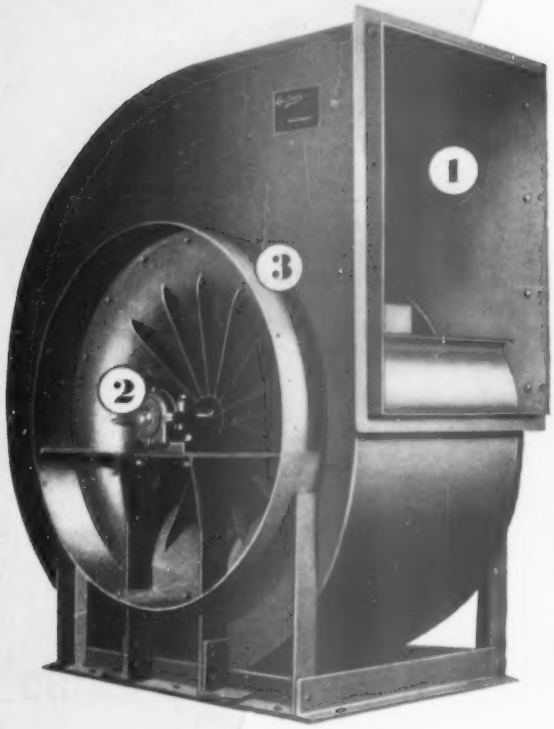
"Buffalo" TYPE "BL" Limit-Load REG. U.S. PAT. OFF. Ventilating Fan

COMPLETE FAN

1. Streamlined housing with outlet designed for most efficient air delivery.
2. Anti-friction or sleeve bearings to suit job requirements.
3. Ample inlet collar for easy connection to ductwork.



In our seventy-six years of fan manufacturing, no fan has been more respected for fine performance than the "Buffalo" Type "LL" Ventilating Fan. This fine performance is now further improved in the new "Buffalo" Type "BL" Limit-Load Fan — designed especially for general ventilation, air conditioning and industrial service.

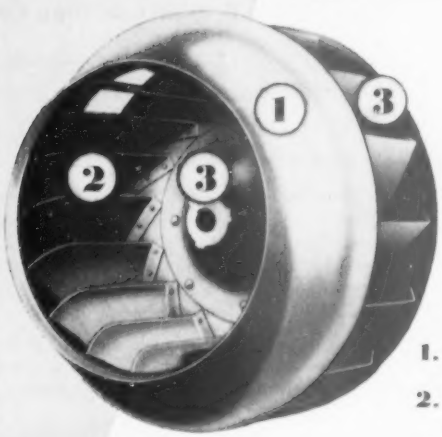
This new fan offers: (1) High efficiency; (2) Minimum noise level, over wide capacity range; (3) Full Limit-Load horsepower characteristic; (4) Stable performance from shut-off to free delivery.

Retaining the husky construction which has characterized "Buffalo" fans for many years, the new Type "BL" has some outstanding quality design features.

The Type "BL" fan will be built in standard sizes and arrangements with rotor diameters from 12¼" to 108¾", to handle from 1,000 to 500,000 cfm.

You will want this superbly-performing new fan with the "Q" Factor* on your next job! Write for new Bulletin F-100, which contains complete engineering details, including performance tables and dimensions.

** The "Q" Factor — The built-in Quality which provides trouble-free satisfaction and long life.*



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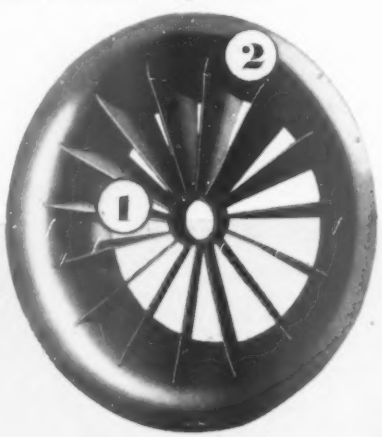
3. Solid back plate with extra heavy hub.



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AUTHORIZED BY N A F M

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1. Furnished as standard, and exclusive with "Buffalo", these stationary inlet vanes reduce turbulence and assure rated air delivery in spite of unfavorable inlet conditions.
2. Die-formed inlet bell matches wheel shroud.

SERVICE!

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SUPPLY BOVAIRD COMPANY

TEXAS

NEW MEXICO

PESA

PETROLEUM EQUIPMENT SUPPLIERS ASSOCIATION

PARTNERS IN PETROLEUM PROGRESS

"Buy From Bovaird"

22 Offices and Stores to Serve You!

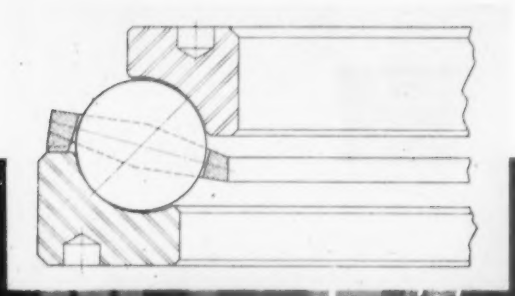
ILLINOIS — Clay City, Grayville, Salem
KANSAS — Chase, Great Bend, Pratt, Russell, Wichita
NEW MEXICO — Lovington

OKLAHOMA — Duncan, Oklahoma City, Pauls Valley, Sapulpa, Seminole, Tulsa
TEXAS — Borger, Dallas, Midland, Odessa, Pampa, Snyder

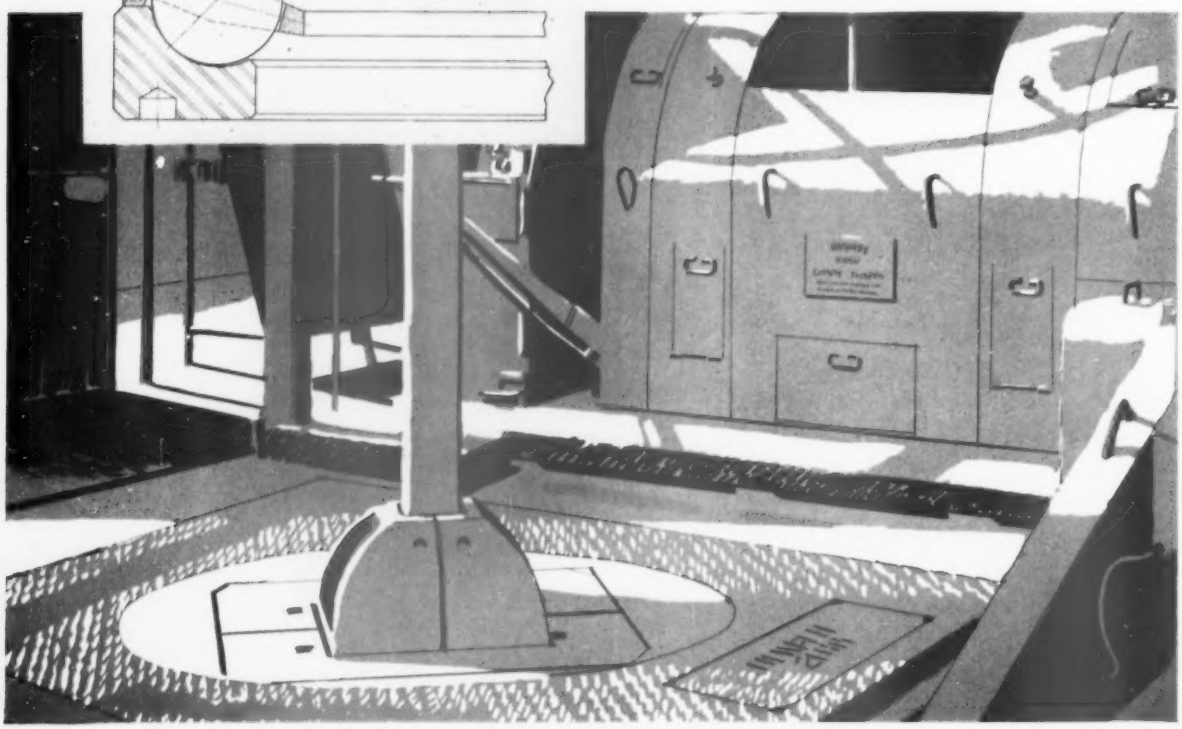
THE Bovaird SUPPLY COMPANY

GENERAL OFFICES
TULSA, OKLAHOMA

82 YEARS OF PROGRESS WITH THE OIL INDUSTRY



For maximum speed, capacity, long-run economy, Oil Well Supply Division, United States Steel Corporation, uses TORRINGTON Angular Contact Ball Thrust Bearings for all four models of its "oilbath" rotaries.



Reaching for Oil at higher speeds!

TORRINGTON Angular Contact Ball Thrust Bearings give you maximum load capacity and rolling efficiency in rotaries. They are designed to handle highest thrust loads, *plus* radial loads imposed by the driving gear, as well as any off-center loading which may be developed by the rotating drill string. They keep tables centered at all times, cut friction to a minimum, permit deeper drilling at higher speeds.

Equally important, TORRINGTON Angular Contact Ball Bearings are quality built for real long-run economy. Bearing alloy steels—carefully heat treated by the most advanced methods—assure excellent resistance to shock and wear. Machined, cast-bronze cages increase bearing life, hold down operating costs.

Keep these facts in mind next time you specify rotary table bearings. Then specify TORRINGTON Angular Contact Ball Bearings—and see for yourself why it pays!

THE TORRINGTON COMPANY

South Bend 21, Ind. • Torrington, Conn.

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Cylindrical Roller • Needle • Ball • Needle Rollers

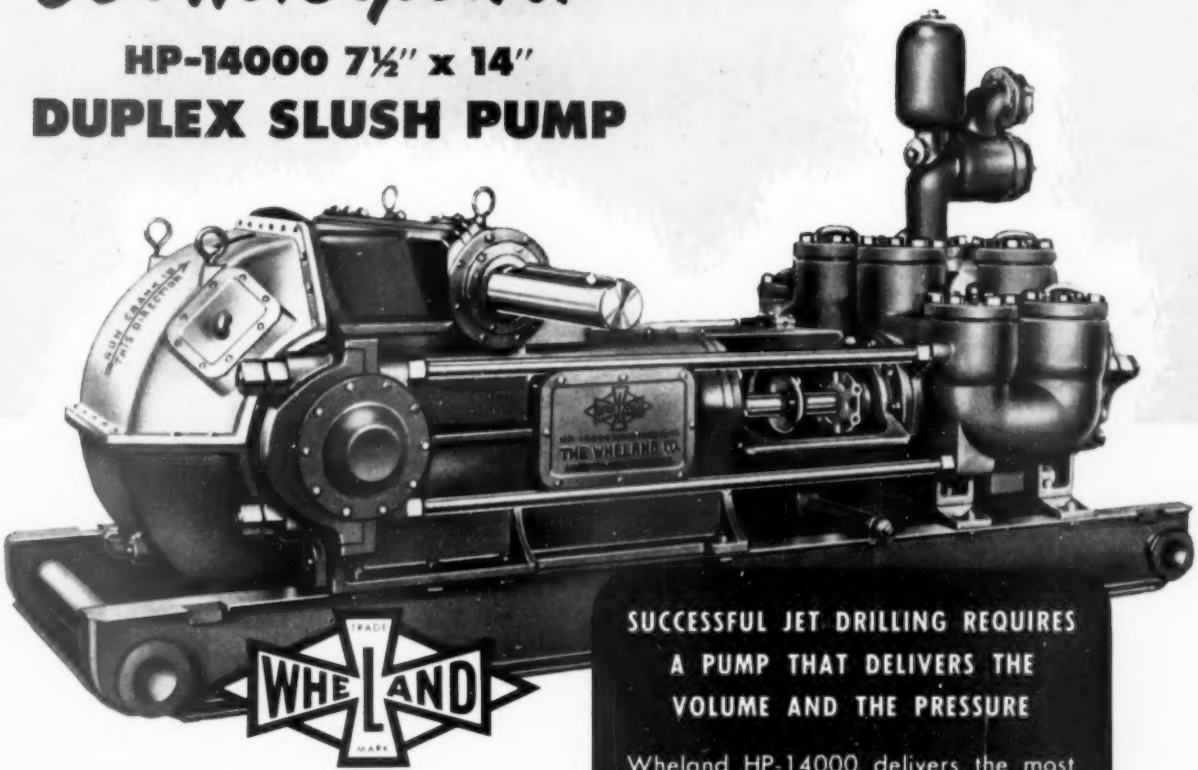
WHELAND

350 Horsepower

HP-14000 7½" x 14"

DUPLEX SLUSH PUMP

Thoroughly proved by years of operation on hundreds of wells in many fields.



the pump for

JET DRILLING!

DATA SHEETS —

Compiled from actual performance of jet drilling with the Wheland HP-14000 are available on request.

SUCCESSFUL JET DRILLING REQUIRES A PUMP THAT DELIVERS THE VOLUME AND THE PRESSURE

Wheland HP-14000 delivers the most pressure per pound of pump, and provides the best balance of pressure and volume for effective jet drilling. This is the pump for jet drilling . . . and the best pump for jet drilling is the best pump for *any* drilling.

Like any pump used on jet drilling, this pump must be fitted with proper size liner and run at correct speed and pressure in relation to:

1. Size, condition and depth of hole.
2. Type and size of drill pipe, drill collars and jets in bit.

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.

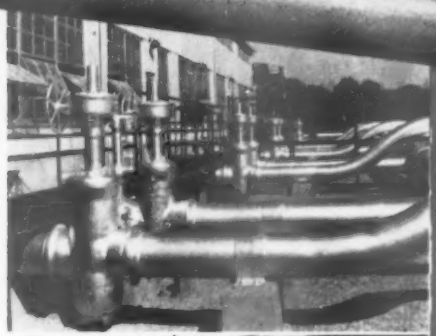
ROTARY DRILLING MACHINERY

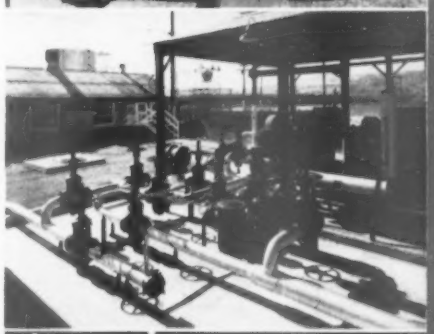
DRAWWORKS • SLUSH PUMPS
ROTARIES • CROWN BLOCKS
TRAVELING BLOCKS • SWIVELS

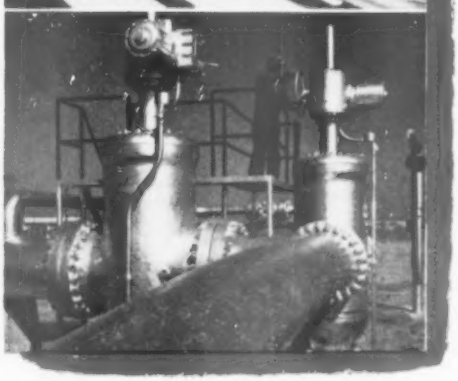
DOMESTIC DISTRIBUTORS & THEIR HEADQUARTERS: Jones & Laughlin Steel Corp., Supply Division, Tulsa, Okla. • Houston Oil Field Material Co., Inc., Houston, Texas • Iverson Supply Co., Tulsa, Okla. • Lucey Products Corp., Tulsa, Okla. • Superior Iron Works & Supply Co., Inc., Shreveport, La. • Industrial Supply Co., Wichita Falls, Texas

EXPORT DISTRIBUTOR: Lucey Export Corporation, 233 Broadway, New York 7, New York — Broad Street House, London, E. C. 2, England

NO MORE TURBULENCE . . .
NO MORE PRESSURE DROP
THROUGH HERE
THAN HERE







You get the same turbulence and the same pressure drop through a W-K-M Pipeline Valve as you get through a length of pipe the same I.D. and length as the valve conduit.

No Turbulence means a minimum of wear at the gate and seats — resulting in low or no maintenance costs involving these parts. **No pressure drop** means that the pump power is concentrated on the transmission of gas, oil and petroleum products, not wasted pushing it past obstructions.

W-K-M Valves offer more economies in maintenance costs and in efficient performance than any other pipeline valve — that's why Most of The World's Newest Pipelines are Tied Together with W-K-M Valves.

W-K-M COMPANY

P. O. Box 2117, Houston 1, Texas
2330 E. 8th St., Los Angeles, Calif.
Export Office: 30 Rockefeller Plaza, New York, N. Y.

W-K-M Valves

W-K-M Pipeline Valves have:
Full-Through-Conduit Flow • Positive Leverlock Gate Control
Pressure Seal Bonnet
Ball Bearing Operation • Superfinished Stems

MARVEL SYNCLINAL FILTERS

SUMP TYPE
(Cutaway)

For Dependable Protection on Petroleum Industry's Operating Equipment

It's The ACTIVE FILTERING AREA That Counts!

The balanced synclinal design of Marvel Filters leaves plenty of space for storage of foreign matter, without flow interference or pressure build-up. Therefore, longer periods of productive operation are attained.

GREATER EFFICIENCY

Because of the combined, outstanding features, in both construction and performance, Marvel Synclinal Filters bring about the greatest degree of efficiency in all production equipment where filtration of liquids is of the utmost importance.

LESS MAINTENANCE

Because Marvel Synclinal Filters may be disassembled, cleaned and reassembled in a matter of minutes by any workman, filter maintenance "down-time" is reduced to the absolute minimum. Line types operate in any position and may be serviced without disturbing pipe connections.

A SIZE FOR EVERY NEED

Marvel Filters are available in sump and line types, in capacities from 5 to 100 g.p.m. and in monel mesh sizes from 30 to 200. Depend on Marvel Synclinal Filters for all your filtration requirements.

TEST AND INSPECT — BEFORE YOU BUY!

To qualified engineers and operators in oil companies and contracting firms we will send a MARVEL SYNCLINAL FILTER to test and inspect before purchase. Please advise type, (Sump or Line) G.P.M. and mesh size you desire for this purpose.

LINE TYPE
(Cutaway)

SUMP TYPE

for installation on Hydraulic Systems in GEOPHYSICAL DRILLING RIGS
Shot Hole
Core
Slim Hole
Work Over
etc.

Oil Well Drilling Rigs
Pipe Line Valves
Machine Tools
Pumping Units
Field Processing Valves
and all Hydraulically Operated Construction Equipment

LINE TYPE

for Installation on Crank Case Lube Oil Filtration
Pump Line Pumping Engines
Gas Compressors
Reciprocating Compressors (Single or Combination)
Engines—Well Pumping or Drilling
Hydraulic Powered Construction Equipment

WATER FILTERS In response to the great demand we have adapted both our sump and line models for use in all water filtering applications. No changes have been made in the basic synclinal design.

MARVEL ENGINEERING COMPANY

625 W. Jackson Blvd., Chicago 6, Ill.

Marvel Engineering Co.
625 W. Jackson Blvd.
Chicago 6, Illinois

OG-105

Without obligation, please send me your Catalog #106 containing complete engineering data on Marvel Synclinal Filters.

Name .....

Company .....

Address .....

City ..... Zone ..... State .....

P&H Diesel Engines

(2-CYCLE)

Are your diesels this easy to service?

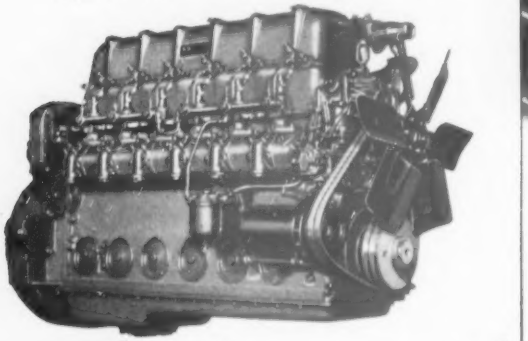
Talk about simplicity! It's hard to imagine an engine simpler than the P&H Diesel! If any service is needed, you work *only* with the part affected.

An injection pump, for example. Replace it separately — in a few minutes. You needn't replace the entire system. Or a scored cylinder: No need to take down the whole engine. A complete new cylinder head and liner assembly can be installed in 40 minutes. And if need be, you can take it from any other P&H Diesel. Think of the convenience. And the time saving!

And by the way: P&H's precision aluminum alloy bearings, with more generous bearing surfaces, have practically eliminated connecting rod bearing troubles.

Your nearest P&H Diesel representative can give you all the reasons why wise users are standardizing on this advanced line of Diesel engines. Or write us.

P&H Diesel Engines are built in 1, 2, 3, 4 and 6-cylinder models — from 20 to 138 h.p.



P&H DIESEL DIVISION
HARNISCHFEGER CORPORATION
CRYSTAL LAKE, ILLINOIS

the P&H *Line*

WHAT'S YOUR ALLOY STEEL PROBLEM?

SELECTION?
STRENGTH?
HARDNESS?
TOUGHNESS?
MACHINABILITY?
HEAT TREATMENT?
TOOL LIFE?
SURFACE FINISH?
LOW PRODUCTION?
HIGH UNIT COSTS?

Check your problem . . . or problems. Then call in Republic's 3-Dimension Metallurgical Service.

The man you meet will be the Republic Field Metallurgist. He comes to your plant, studies your product, examines your production methods. His report goes back to the Republic Mill and Laboratory Metallurgists.

These three specialists then work together to diagnose the trouble. From their wide knowledge of alloy steels, how they respond to forging, to heat treatment, to any work or process, they make recommendations. Not general ones, but those suitable for your plant and your particular problems, based on efficiency. And they stay within, or below, your cost limits. The results? Higher quality, greater output, economy.

Scores of Republic customers already have attained these benefits by taking advantage of this service. Ask your Republic salesman to call in his 3-Dimension Metallurgical Service. It's yours for the asking.

3-DIMENSION Metallurgical Service

. . . combines the extensive experience and coordinated abilities of Republic's *Field, Mill* and *Laboratory* Metallurgists with the knowledge and skills of your own engineers. It has helped guide users of Alloy Steels in countless industries to the correct steel and its most efficient usage. IT CAN DO THE SAME FOR YOU.

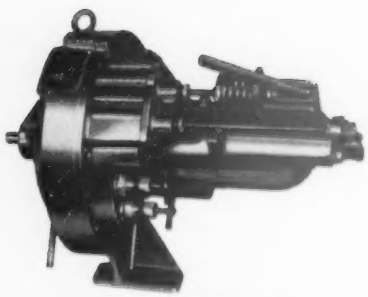
REPUBLIC STEEL CORPORATION
Alloy Steel Division • Massillon, Ohio
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N.Y.

Republic REPUBLIC STEEL
ALLOY STEELS

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Plates, Pipe, Bars, Wire, Pig Iron, Bolts and Nuts, Tubing

THE KEY WORD IS *sturdy*

THE *new* ELLIOTT GEARED TURBINE



The new JR turbine

At the turbine end, the ever-dependable and popular Elliott YR Turbine, which has demonstrated its remarkable staying powers beyond all question in every industry utilizing auxiliary steam drive units. The versatility of this machine, with its wide selection in governors and controls, is only matched by its strength and "keep-going" endurance.

At the gear end, the equally tough gear assembly with gear and pinion of double-helical type to provide quiet power flow without thrust. Pinion and turbine wheels are both mounted on the same shaft. Jig-drilled bolting in gear-case and turbine insure positive alignment and a rigid unit. Bearings have forced-feed lubrication, and the gear has oil sprays at the meshing point to insure lubrication and cooling.

Also available in "coupled" type, with individual turbine and high-speed gear shafts flexibly coupled.

For details contact your local Elliott representative, or write Elliott Company, Jeannette, Pa. for bulletin.

ELLIOTT Company

STEAM TURBINE DEPARTMENT

H3.2

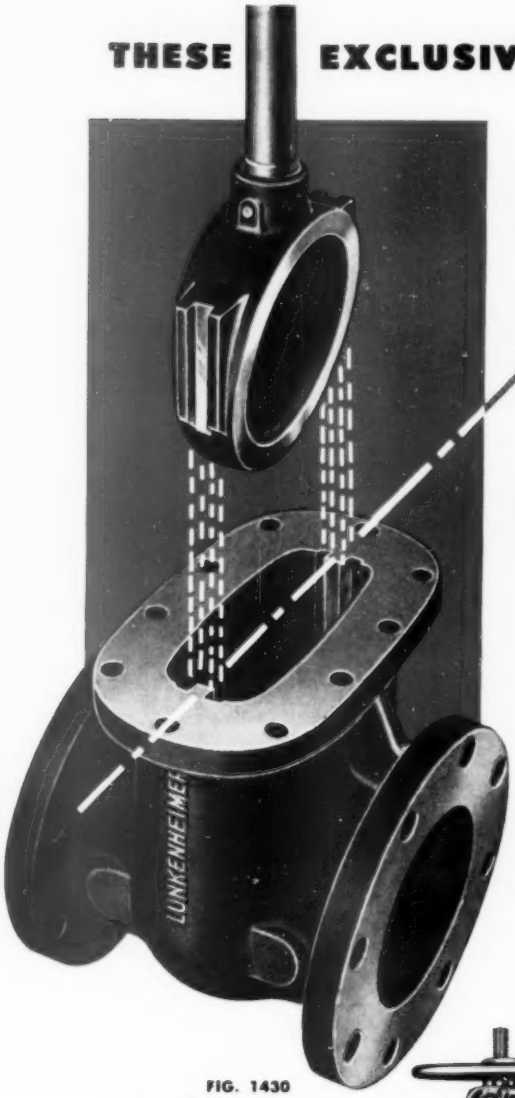
THESE EXCLUSIVE PRECISION-MACHINED GUIDES

eliminate chatter

lengthen service life

IN LUNKENHEIMER

IRON BODY GATE VALVES



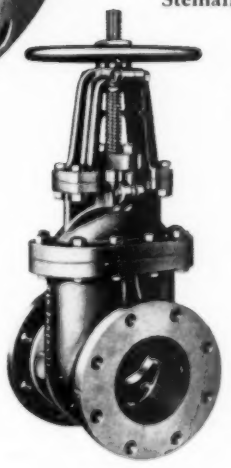


FIG. 1430

Iron Body Bronze Mounted
Also Available in
FIG. 1576 and 1578
All Iron
Screwed and Flanged Types

This exclusive machined-guide design is only one of the many original money-saving features of Lunkenheimer Iron Body Gate Valves. Gate valve chatter — the sound of wasteful, accelerated wear—is eliminated by Lunkenheimer's unique method of manufacture. Not only are the guide channels in the disc accurately machined, but the guides in the body, as well. These precision-machined guides hold the disc firmly in line as the valve is opened and closed — prevent pressure from forcing the disc against the opposite seat. Result: no clatter, no chatter, and much longer valve life. When repair is necessary, replacement parts can be easily installed without machining or fitting — an exclusive Lunkenheimer feature. In addition, Lunkenheimer Iron Body Gate Valves have long-wearing Stemalloy® Stems, bronze bushings that protect the stem from corrosion and scoring, and handy swing bolts and shelves that make repacking so easy. No other iron-body valve gives you so much *outstanding* value.

WRITE FOR Circular 564, describing the complete Lunkenheimer Iron Body Gate Valve line. Address: The Lunkenheimer Co., Box 360F, Cincinnati 14, Ohio, or phone your Lunkenheimer Distributor.

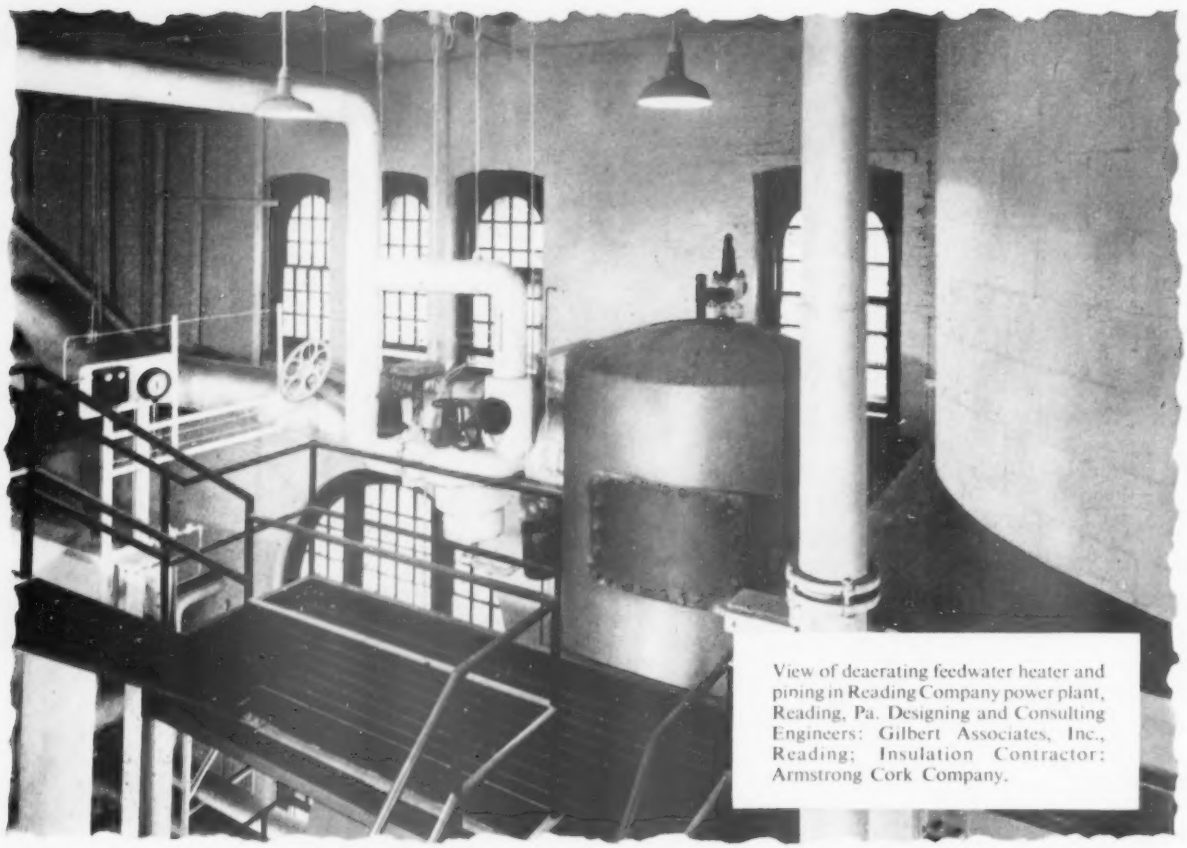
LUNKENHEIMER
L®
QUALITY

IRON • STEEL • BRONZE

LUNKENHEIMER®

THE ONE *Great* NAME IN VALVES

L-253-9A



View of deaerating feedwater heater and piping in Reading Company power plant, Reading, Pa. Designing and Consulting Engineers: Gilbert Associates, Inc., Reading; Insulation Contractor: Armstrong Cork Company.

"Featherweight" 85% MAGNESIA

USED IN MODERNIZATION OF READING COMPANY POWER PLANT

When the Reading Railroad recently modernized its repair shop power plant, "Featherweight" 85% Magnesia was extensively used. The illustration above shows some of the piping and feedwater heater which was covered with this dependable insulation.

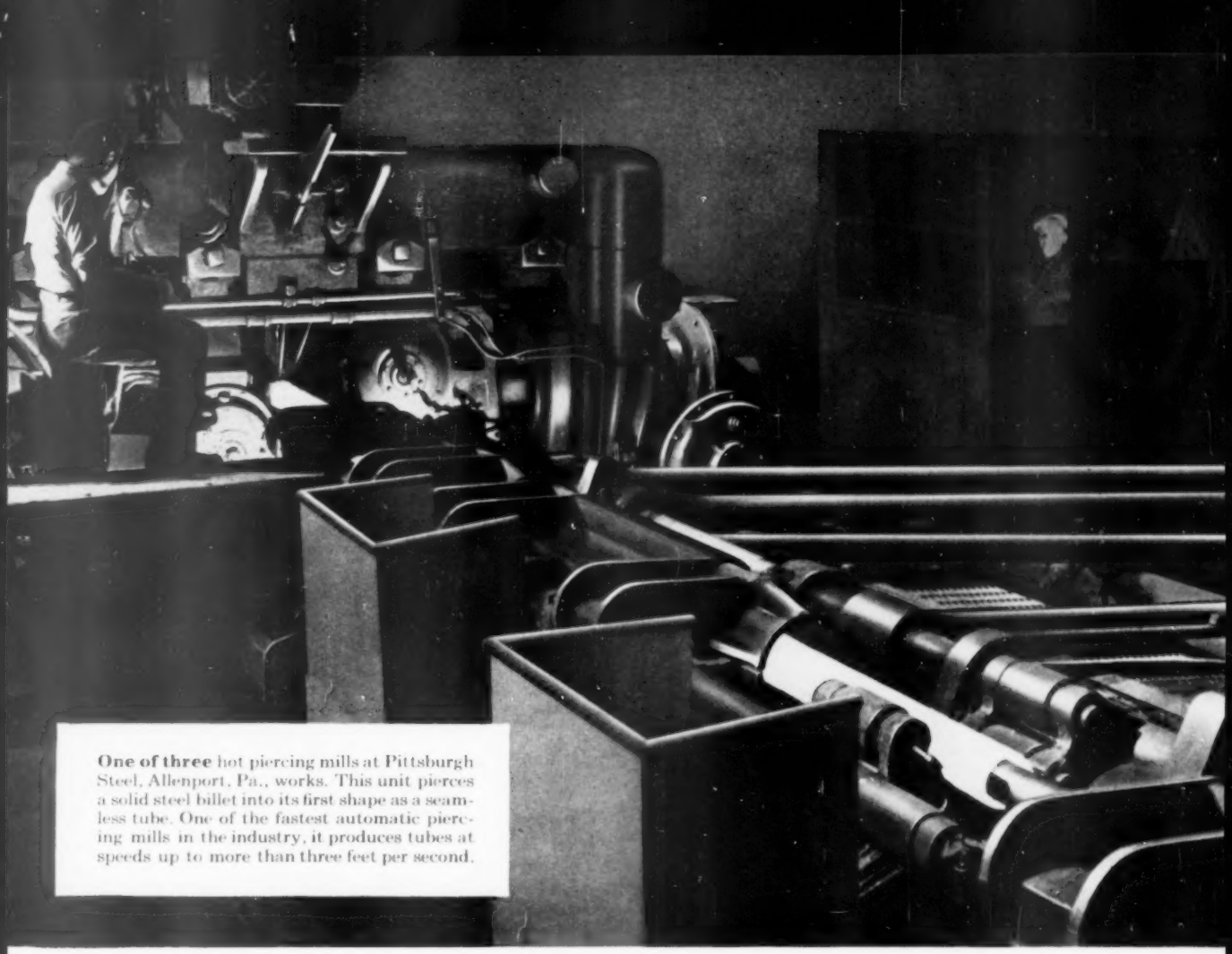
For insulating piping and equipment with temperatures up to 600°F., "Featherweight" 85% Magnesia is unexcelled. It acts as an efficient insulator for a lifetime, too—unaffected by vermin, moisture, vibration, or temperature change. It is made in various shapes and thicknesses for easy application over any equipment or piping.

The K&M distributor in your area is an experienced applicator who will gladly tell you more about "Featherweight" 85% Magnesia. Call him today! Or, write directly to us for information.

Nature made asbestos...
Keasbey & Mattison has made it serve mankind since 1873

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

K&M best in asbestos ®



One of three hot piercing mills at Pittsburgh Steel, Allenport, Pa., works. This unit pierces a solid steel billet into its first shape as a seamless tube. One of the fastest automatic piercing mills in the industry, it produces tubes at speeds up to more than three feet per second.

Expansion Must Have Strong Foundations

When Pittsburgh Steel Company launched its $62.8-million Program of Progress, it had strong foundations to build on. These foundations consist of some of the most modern equipment in the industry for high-quality seamless tubular and wire products.

On the strength of these facilities, Pittsburgh Steel has kept rolling steadily ahead as it expanded its steelmaking capacity by 48% and began increasing its finishing facilities by 82%. Construction of its new hot-rolled sheet mill is complete, and by early next year a new cold-rolled sheet mill will be in production. Pittsburgh Steel will be entirely transformed into a new steel company.

Throughout this expansion, advances in the production of seamless tubes and wire products have kept pace. One example is the installation, at a cost of over $2 million, of the industry's fastest and most automatic seamless casing finishing line to speed production and improve the quality of finished seamless tubes. This and other improvements mean Pittsburgh Steel is better equipped than ever before to serve you with the products it has always made, as well as with the products it is making for the first time.

The entire production structure of the company has been strengthened . . . its market position has been improved, because it is able to offer a broader range of products . . . its earnings potential for stockholders has been increased . . . new advancement opportunities have opened up for its employees. You are watching the birth of a stronger new integrated steel producer . . . to serve the nation's peacetime industries, and if needed, to supply new muscle for defense.

Program of Progress

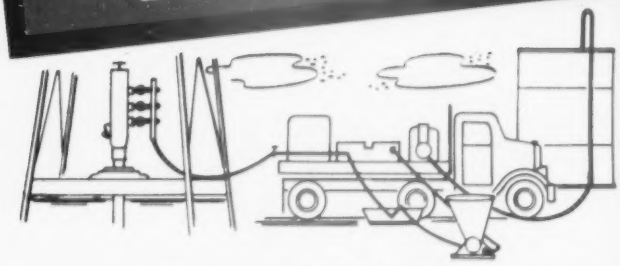
Acquisition of Thomas Steel	100% Complete
Increase of Blast Furnace Capacity by 12%	85% Complete
Increase of Open Hearth Capacity by 48%	100% Complete
Installation of new 66-inch High Lift Blooming-Slabbing Mill	100% Complete
Installation of Continuous 66-inch Hot Rolled Sheet-Strip Mill	100% Complete
Installation of 66-inch Cold Rolled Sheet-Strip Mill	80% Complete

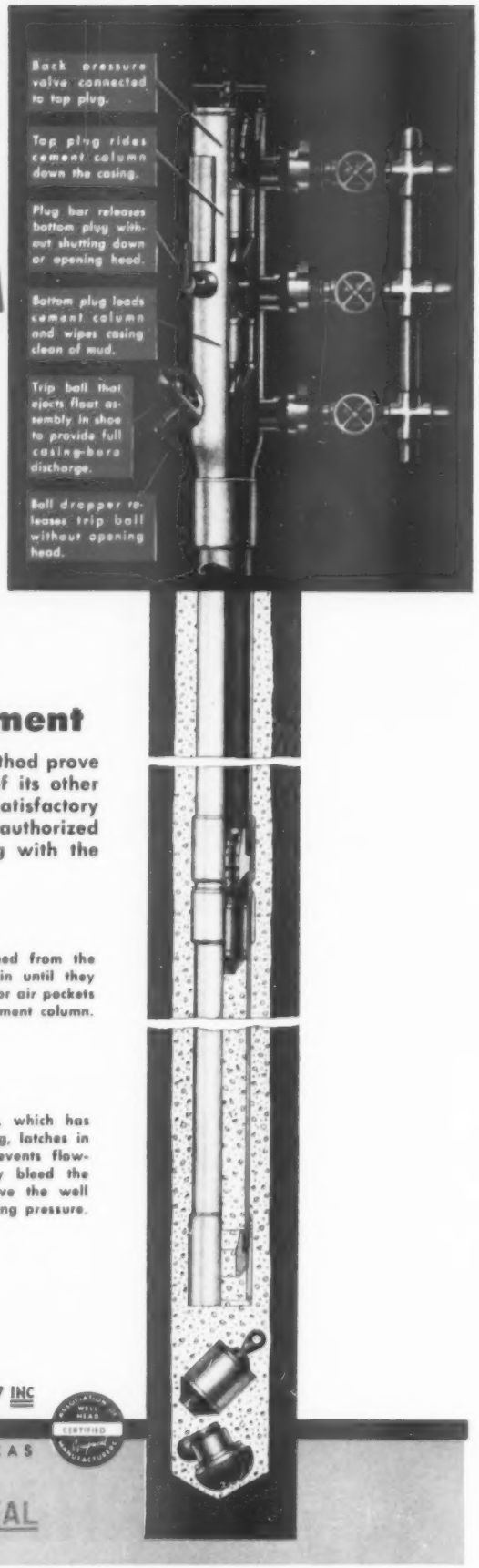
"Everything New But the Name"

Pittsburgh Steel Company

Pittsburgh 30, Pennsylvania

From HEAD to SHOE




Back pressure valve connected to top plug.
Top plug rides cement column down the casing.
Plug bar releases bottom plug without shutting down or opening head.
Bottom plug loads cement column and wipes casing clean of mud.
Trip ball that ejects float assembly in shoe to provide full casing-bore discharge.
Ball dropper releases trip ball without opening head.

RECTOR FULBORE CEMENTING METHOD

Prevents Contamination of Cement

Hundreds of master cementing jobs by the Rector Fulbore Method prove the efficiency of its two plug method and the importance of its other exclusive features which are the basis of successful and satisfactory cementing jobs everytime. Ask your Rector Representative or authorized supply store for the complete story about better cementing with the Rector Fulbore Method.

PROTECTS AGAINST CONTAMINATION

The cement is completely and effectively segregated from well fluids by two closely fitting plugs which are positively and simply released at the proper time by mechanical means from outside the cementing head.

CLOSED CIRCUIT

Cementing head is never opened from the time cementing operations begin until they are completed. It is impossible for air pockets to form in either the mud or cement column.

FULL CASING DISCHARGE

Float assembly is pressure-ejected from the float shoe by the trip ball after casing string has been floated to position. This unrestricted opening reduces the load on the pumps . . . circulates greater volume with same pump pressure and results in higher velocity in space between casing and bottom of hole.

POSITIVE FLOW-BACK

When the back pressure valve, which has traveled down with the top plug, latches in the stall collar, it positively prevents flow-back of cement. Operator may bleed the pressure back to zero and leave the well open or close it in at final runnjng pressure.

RECTOR WELL EQUIPMENT COMPANY INC

★ MAKING THE OIL INDUSTRY SAFER

1100 NORTH COMMERCE ST. FORT WORTH, TEXAS

Houston Plant: 2215 Commerce St.

REPRESENTATIVES IN ALL ACTIVE FIELDS

RECTORHEAD RECTOR FULBORE CEMENTING METHOD RECTORSEAL

24 ACRES *Cover the World*

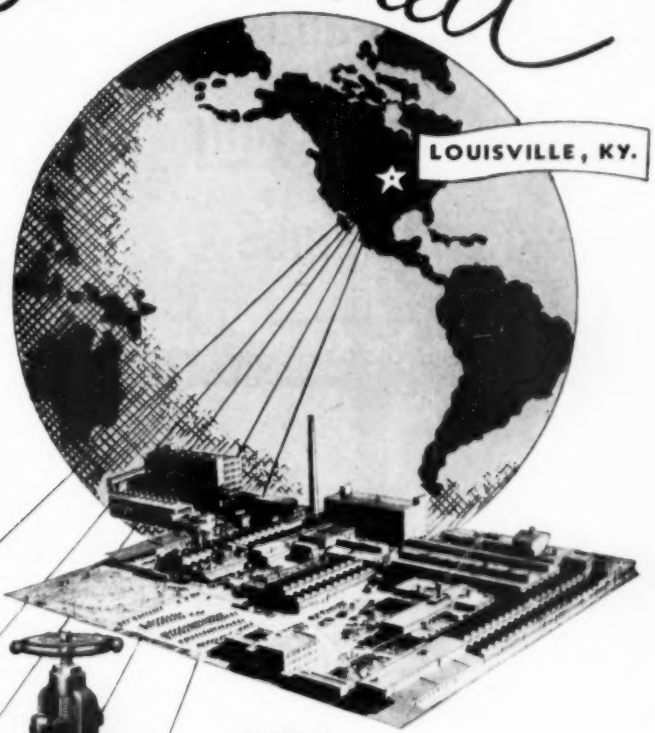
. . . with TOP QUALITY

DROP FORGED STEEL

VALVES, FITTINGS and FLANGES

by

Vogt



Air View of
Henry Vogt Machine Co.

This 24 acre Vogt plant supplies the most comprehensive line of top quality *drop forged* steel piping materials anywhere available to industry. That's why they're the choice of leading refineries, power plants, chemical plants, etc., the world around!

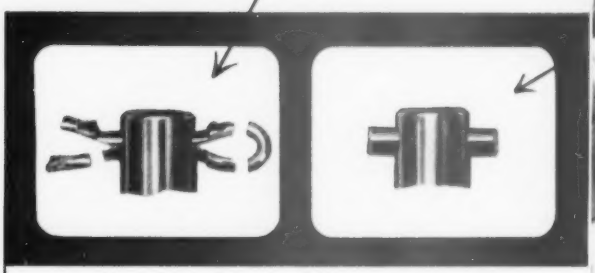
OUR COMPLETE LINE INCLUDES

Flanged, Screwed and Socket Weld End Globe, Gate and Check Valves • Ells, Tees and Crosses • Couplings • Bushings • Plugs • Unions • Flanges and Flange Unions • Welding Heads

HENRY VOGT MACHINE CO. LOUISVILLE 10, KY.

Branch Offices: New York, Philadelphia, Chicago, Cleveland, St. Louis, Dallas, Charleston, W. Va.

Do cotter pin failures make "stop-and-go" operators of your roller chains?



Spring-Lock Fasteners outlast cotter pins more than ten to one!

Standard heat-treated cotter pin (left) shows this wear after only 3 hours on laboratory fatigue tester. Fifty hours of same grueling punishment leave Spring-Lock (right) in unimpaired state.

Do some of your roller chain applications suffer—run up downtime through cotter pin failures?

The answer to your problem has been tested—and *proved*—in the field for over a year.

The Morse Spring-Lock Fastener is *not* a pin; has none of a pin's limitations. The Spring-Lock is a spring steel cylinder that is *compressed* into a pinhole smaller than its own diameter; locks into place through its expansion. The seated Spring-Lock *cannot* slip or shear; must be removed with hammer and punch.

Assembly and disassembly of Spring-Lock-fastened Morse Roller Chains is easier and faster, because the fastener *can* be inserted and removed with only punch and hammer. Then, the Spring-Lock can be used time after time.

At no increase in price, Spring-Lock Fasteners are currently available in the large-pitch Morse Roller Chains: $1\frac{1}{4}$", $1\frac{1}{2}$", $1\frac{3}{4}$" and 2" pitch, single or multiple widths, standard or heavy-duty series. If some of your roller chain applications have been marked by troublesome, costly cotter pin failures, check into Morse Roller Chains *with Spring-Lock Fasteners.* Standard cotter pins are also available, and will be furnished unless otherwise specified. For more information, see your local Morse distributor or factory representative listed here. MORSE CHAIN COMPANY, Dept. 526, 7601 Central Avenue, Detroit 10, Michigan.

BRANCH OFFICES AND REPRESENTATIVES

Houston
Sales & Warehouse
Morse Chain Company
1312 La Branch Ave.
P. O. Box 896

New York
Morse Chain Company
50 Church St.

Los Angeles
J. W. Minder
6011 Central Ave.

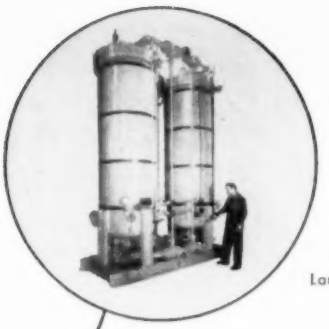
St. Louis
Bates Sales Co.
1025 N. Sixth St.

Pittsburgh
Morse Chain Company
803 Martin Bldg.
119 Federal St.

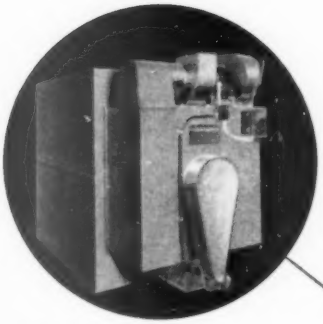
Vancouver, B. C.
Western Equipment, Ltd.
102 Main St.

M-PT
MORSE *means* POWER TRANSMISSION

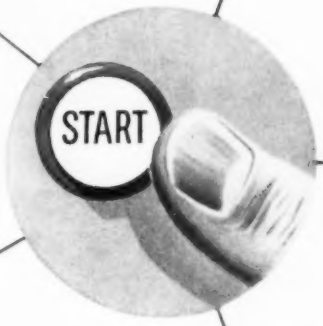
MORSE
MECHANICAL POWER TRANSMISSION PRODUCTS

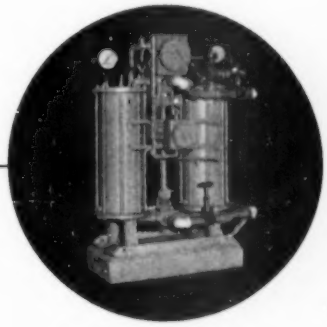


Large liquid hydrocarbon Lectrodryer.

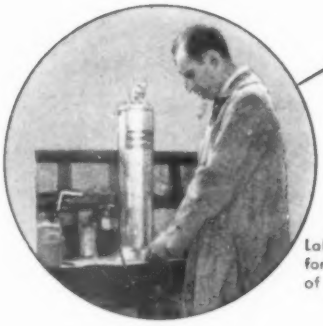


Air Conditioning Lectrodryer.

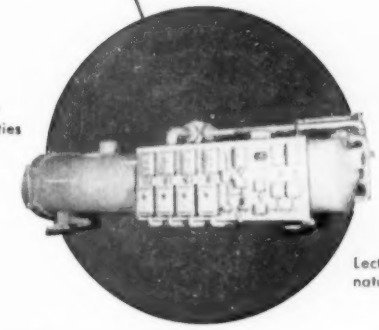




Small, dual compressed air dryer.



Laboratory Lectrodryer for drying small quantities of gases.



Lectrodryer for drying compressed natural gas.

DRYness . . .

by pressing a button!

Lectrodryers* DRY air and gases to dewpoints as low as −110°F. Moisture content of organic liquids can be reduced to 3 or 4 parts per million.

Wherever you need DRYness . . . in a laboratory jar, on stream in some tricky process, or in a warehouse . . . from atmospheric to 6000 lbs. pressure . . . there's Lectrodryer equipment to give you DRYness automatically, continuously, economically.

Petroleum, chemical, pharmaceutical, plastics and synthetic rubber industries rely on Lectrodryers to provide vital DRYness . . . speed up production . . . protect delicate chemicals.

You can predetermine the constant degree of DRYness you want. Lectrodryer engineers, calling on their 22 years of combating unwanted moisture, can provide reliable assistance.

Data Available—Write for "Because Moisture Isn't Pink," a booklet describing Lectrodryers, their function and application: The Pittsburgh Lectrodryer Corp., 325 32nd St., Pittsburgh, Pa.

In England: Birlec, Limited, Tyburn Road, Erdington, Birmingham.
In France: Stein et Roubaix, 24 Rue Erlanger, Paris XVI.
In Belgium: S. A. Belge Stein et Roubaix, 320 Rue du Moulin, Bressoux-Liege

LECTRODRYERS DRY
WITH ACTIVATED ALUMINAS

LECTRODRYER

*REGISTERED TRADEMARK U. S. PAT. OFF.

MEMO

OFFICE OF THE PRESIDENT

Scott—
Did you know Metal Goods Corporation has such a complete stock of mechanical steel tubing and cold finished bars?

J. L.

STOCK LIST

METAL GOODS CORPORATION — MGC — SAFE-T-METALS

COLD DRAWN SEAMLESS MECHANICAL TUBING
COLD FINISHED STEEL BARS • STEEL TUBING

COLD DRAWN SEAMLESS MECHANICAL TUBING

GRADE MT-1015 RANDOM LENGTHS, 17-24 FEET

O. D.	Decimal Wall Gauge	Quantity in Feet
1/4"	.022	1,385
5/16"	.065	5,203
3/8"	.035	226
	.049	54
	.065	1,114
	.083	784
7/16"	.065	19,640
1/2"	.083	240
	.120	495
	.156	*
	.188	50
9/16"	.083	1,248
	.109	1,667
	.120	1,904
	.156	2,398
	.188	1,882
5/8"	.120	1,465
	.156	1,969
	.188	103
	.250	886
11/16"	.120	1,754
	.188	305
	.250	962
3/4"	.188	1,508
	.120	1,701
	.156	1,842
	.188	2,309
13/16"	.120	868
	.156	1,179
	.188	1,124
	.218	987
7/8"	.065	56
	.120	1,265
	.188	*
	.218	*
	.250	509
15/16"	.156	1,213
	.188	62
	.250	987
1"	.035	111
	.120	1,761
	.156	2,368
	.188	260
	.218	*
	.250	22
	.313	643
	.375	*
1-9/16"	.250	*
1-5/8"	.095	475
	.120	*
	.188	750

O. D.	Decimal Wall Gauge	Quantity in Feet
1-5/8"	.218	*
	.250	812
	.375	*
	.438	*
1-3/4"	.120	*
	.188	832
	.218	691
	.250	*
	.313	*
	.375	84
	.500	*
1-13/16"	.188	91
	.313	138
1-7/8"	.120	1,181
	.156	371
	.218	675
	.375	414
2"	.065	1,023
	.095	*
	.120	1,600
	.156	774
	.188	707
	.218	*
	.250	553
	.281	*
	.313	509
	.375	411
	.438	64
	.500	*
2-1/8"	.125	*
	.188	643
	.218	*
	.250	504
2-1/4"	.065	446
	.120	1,647
	.188	1,204
	.218	626
	.250	203
	.375	*
	.625	*
2-3/8"	.156	1,221
	.188	25
	.220	*
	.281	*
	.313	*
	.500	*
2-1/2"	.095	410
	.120	896
	.219	512
	.250	1,024
	.313	*
	.375	358

O. D.	Decimal Wall Gauge	Quantity in Feet
2-1/2"	.438	147
	.500	*
	.750	*
2-3/4"	.120	529
	.188	454
	.250	29
	.375	*
	.500	377
2-7/8"	.188	*
	.218	903
	.250	*
	.438	*
3"	.120	247
	.156	491
	.188	869
	.218	408
	.250	294
	.375	18
	.500	*
	.562	*
3-1/8"	.188	*
3-1/4"	.120	501
	.188	*
	.250	5
	.375	*
	.500	98
3-3/8"	.188	1,091
	.375	*
3-1/2"	.120	100
	.188	*
	.218	7
	.250	592
	.313	338
	.375	*
	.500	*
	.625	*
3-5/8"	.188	118
	.313	102
	.375	*
	.500	*
3-3/4"	.120	*
	.188	113
	.250	*
	.500	*
4"	.120	*
	.188	267
	.250	197
	.313	*
	.375	*
	.500	*
4-1/2"	.250	207
5"	.250	*

* These items are on order. Delivery expected early third quarter. Consult us for sizes not shown.

COLD FINISHED STEEL BARS

QUANTITY IN POUNDS

ROUNDS

B-33		C-1018-20	
15/64"	153	1/4"	197
11/16"	11,020	5/16"	4,080
1"	9,299	3/8"	4,968
1-1/16"	7,406	9/16"	4,473
1-3/8"	8,237	5/8"	10,000
1-7/16"	52	11/16"	6,046
1-1/2"	6,501	3/4"	5,560
1-9/16"	2,416	13/16"	11,435
1-5/8"	1,961	7/8"	10,800
2"	8,441	1"	12,355
2-3/4"	9,491	1-1/8"	12,350
		1-3/16"	13,839
C-1213		1-1/4"	15,922
5/16"	1,780	1-5/16"	6,152
3/8"	9,300	1-3/8"	10,200
7/16"	8,603	1-7/16"	8,331
1/2"	5,761	1-5/8"	16,059
9/16"	253	1-11/16"	5,590
5/8"	5,714	1-15/16"	3,278
11/16"	6,112	2"	11,939
13/16"	3,506	2-1/16"	2,689
15/16"	6,140	2-1/4"	1,200
1"	523	2-5/16"	1,798
1-1/8"	5,780	2-3/8"	1,838
1-3/16"	3,287	2-9/16"	4,220
1-11/16"	6,090	2-5/8"	6,965
1-3/4"	10,390	2-3/4"	1,435
2-15/16"	6,350	2-7/8"	2,362
		2-15/16"	3,200
		3"	7,546

SQUARES

B-33	
3/16"	1,379
5/16"	536
7/16"	2,988
1/2"	1,825
C-1213	
3/16"	862
9/16"	2,279
5/8"	10
7/8"	5,373
1"	19
C-1018-20	
1-1/2"	19

HEXAGONS

B-33	
5/8"	689
1"	2,354
1-1/4"	99
1-1/2"	27
C-1213	
7/16"	3,732
5/8"	6,340
13/16"	2,013
1"	49
1-1/16"	480
1-1/8"	1,515
1-3/16"	1,381
1-3/8"	1,456
1-1/2"	3,848

FLATS C-1018-20

1/8	x 1-3/4	1,440
	x 2	3,230
	x 2-1/4	42
	x 2-1/2	2,187
	x 3-1/2	3,967
	x 4	2,392
	x 6	66
3/16	x 1-1/2	2,111
3/16	x 2	794
	x 4	1,651
	x 6	1,213
1/4	x 1-1/2	466
	x 1-3/4	2,130
	x 2	2,157
	x 2-1/2	2,780
	x 3	460
1/4	x 4	1,229
	x 6	3,508
5/16	x 1-1/2	1,934
	x 2	3,027
3/8	x 1-1/2	3,374
	x 2	2,024
	x 4	2,045
1/2	x 1-1/4	4,043
	x 4	1,990

STEEL TUBING

GRADE MT-1010 RANDOM LENGTHS

SEAMLESS HYDRAULIC, ANNEALED

O. D.	Decimal Wall Gauge	Quantity in Feet
1/4"	.035	1,875
5/16"	.035	2,577
3/8"	.035	962
	.049	220
	.065	2,996
1/2"	.049	2,257
	.065	4,342
	.083	4,580
5/8"	.035	4,360
	.049	2,679
	.065	8,138
	.083	2,061
3/4"	.049	912
	.065	1,985
1"	.065	3,613

COLD ROLLED WELDED, FLASH REMOVED

O. D.	Decimal Wall Gauge	Quantity in Feet
1/2"	.035	2,686
	.049	2,182
	.065	5,000
5/8"	.035	2,935
	.049	3,092
	.065	202
3/4"	.035	8,182
	.049	5,658
	.065	6,113
7/8"	.049	3,075
	.065	6,631
	.083	80
1"	.035	5,302
	.049	6,588
	.065	2,466
	.083	2,886
1-1/8"	.049	652
1-1/4"	.035	2,748
	.065	736
	.083	2,578
1-3/8"	.035	898
1-1/2"	.049	3,435
	.065	3,711
	.083	5,417
2"	.049	3,057
	.065	3,428
	.083	2,968
2-1/8"	.083	747
2-1/2"	.065	2,991

METAL GOODS CORPORATION

GENERAL OFFICES: ST. LOUIS 15, MISSOURI

St. Louis 15, Missouri
5239 Brown Avenue
Nelson L. Hower
Phone: GOodfellow 1234

Kansas City 16, Mo.
1300 Burlington
Frank D. Hogan
Phone: NOrclay 3516

Dallas 9, Texas
6211 Cedar Springs Rd.
Sam D. Hodgdon
Phone: ELmhurst 3271

Tulsa 3, Oklahoma
302 North Boston
Scott J. Harrison
Phone: 4-4101

Denver 2, Colorado
2425 Walnut Street
Neal Dehn
Phone: AComa 5891

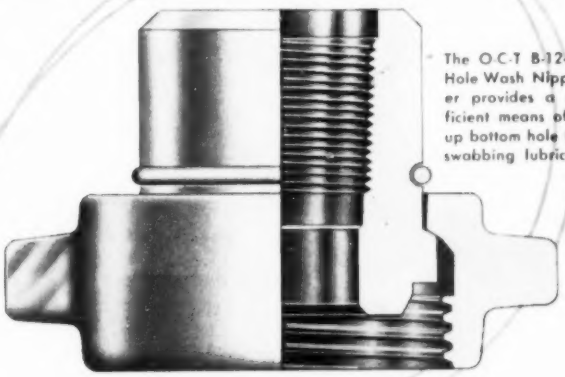
Houston 3, Texas
711 Milby Street
Harris T. Gregg
Phone: CEntral 8881

New Orleans 12, La.
432 Julia Street
Carl T. Wedemeyer
Phone: CAnal 7373

IT FITS

How's this for interchangeability!

If your bottom hole test and wire line truck is equipped with the O-C-T B-12-A Bottom Hole Wash Nipple Adapter, your connection problems are minimized. It will fit these fittings with no additional adapters.



The O-C-T B-12-A Bottom Hole Wash Nipple Adapter provides a quick, efficient means of hooking-up bottom hole tester and swabbing lubricators.

That's why 7 out of 10 operators select O-C-T fittings on their Xmas Trees

The best insurance you can get for quick, leak-proofed connections is to standardize on O-C-T for all your fittings. O-C-T has long recognized the extra economy that interchangeability of parts provides operators . . . and O-C-T has been a leader in establishing a new standard for flexibility in fittings. The result is that more operators now select O-C-T fittings than any other make. Check with your supply store. You'll be ahead if you specify O-C-T Crosses, Tees, and Chokes on your next Christmas Tree. Available through more than 700 supply store locations.

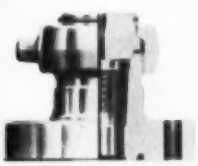
HERE

The O-C-T Type BC-14-A provides a combination threaded cross or tee and a bottom hole test adapter in one unit.

HERE

The O-C-T Type BT-14-A is a similar unit to the BC-14-A.

HERE

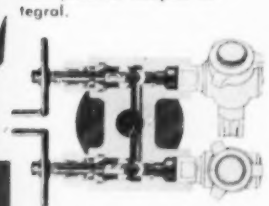


The O-C-T Type B-15-A Bottom Hole Test Adapter is designed for use where an integral flanged unit is preferred by the operator.

HERE

The O-C-T JE-1 Flow Control provides a single wing tree with the bottom hole pressure adapter integral.

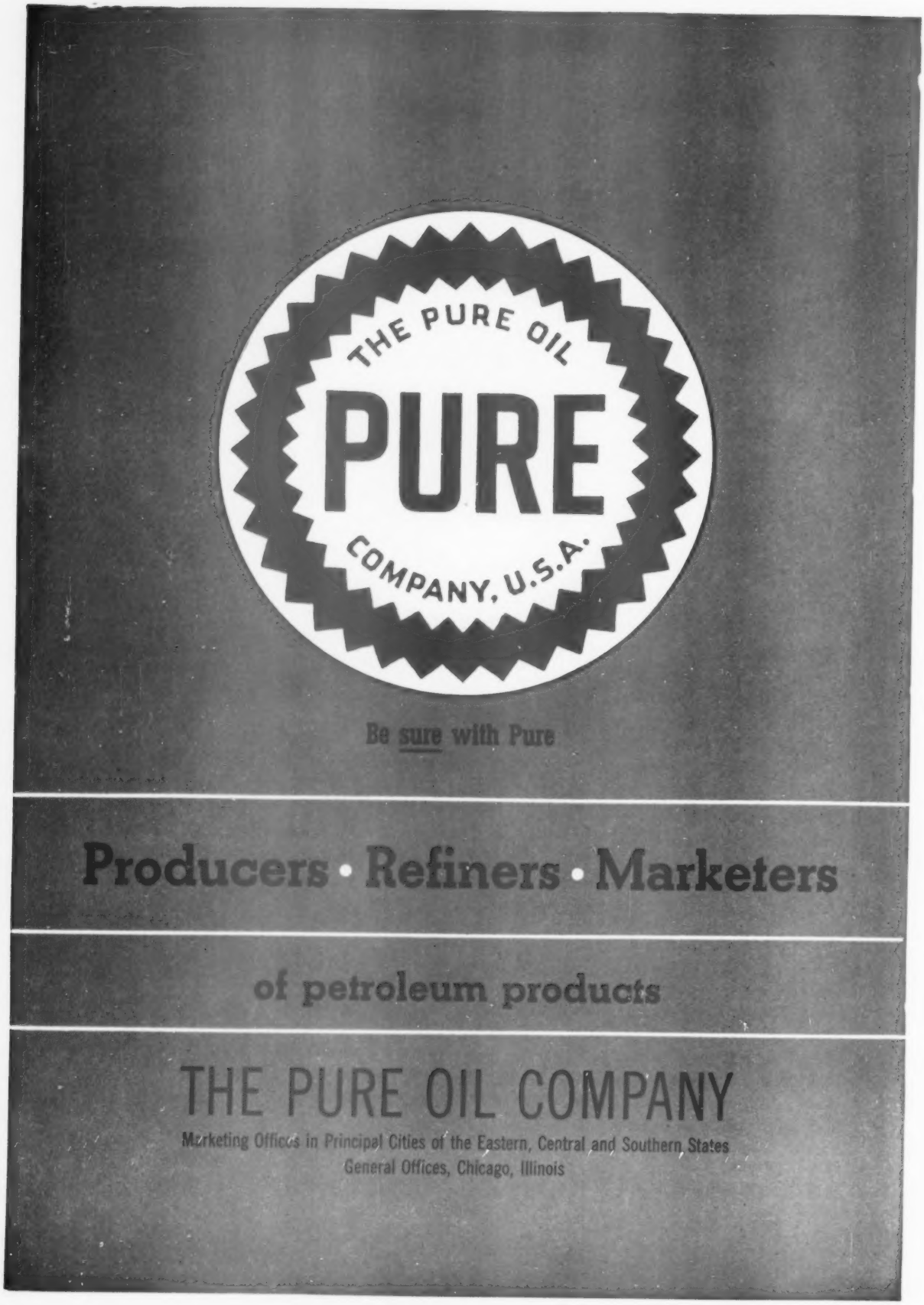
HERE



The O-C-T Dual Flow Control replaces 13 different fittings and makes it possible for the operator to switch the flow from one sized choke to another without closing in the well.

Oil Center Tool Co. P. O. Box 3091 Houston 1, Texas

Export Representatives: Sterling Areas—Le Grand, Sutcliff & Gell, Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston 1, Texas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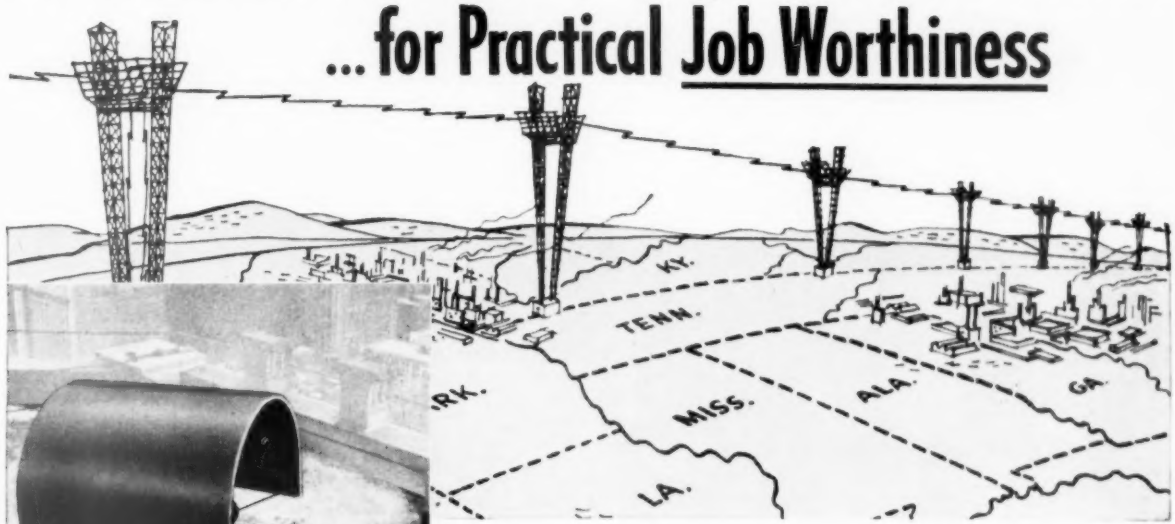
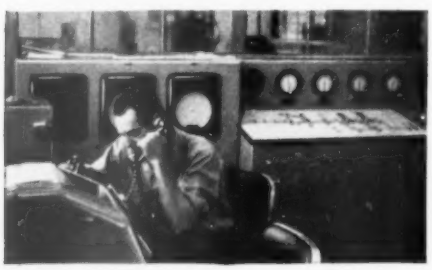
PURE
COMPANY, U.S.A.
Be sure with Pure
Producers • Refiners • Marketers
of petroleum products
THE PURE OIL COMPANY
Marketing Offices in Principal Cities of the Eastern, Central and Southern States
General Offices, Chicago, Illinois

Motorola Proves-Up Microwave

... for Practical Job Worthiness



Operating on a round-the-clock basis for Texas-Illinois Natural Gas Pipeline Co., this Chicago roof-top installation terminates a thousand-mile Motorola Microwave system that provides the ultimate in industrial communications.



Simultaneous transmission of numerous telemetering and voice signals over one radio-frequency carrier allows positive, instantaneous control over widely separated, remote system facilities.

Successful Motorola Engineering has produced the kind of thoroughly dependable Microwave that Industry and Safety Services are adopting with justified confidence.

Motorola systems are in and working! Thousands of miles of multi-channel Motorola Microwave systems, with hundreds of operating stations, have been designed, installed and are in daily operation for many pipeline companies, civil agencies and airlines. Eight Motorola systems have been operating 24 hours daily, non-stop, for over four years! With additional major systems under construction, Motorola continues to add to the extensive background of field and engineering experience that has brought outstanding industry acceptance. Below is a partial list of systems installed and operating, and those under construction (*) or under contract (**):

Job-Proven Microwave . . . by the Leaders of the 2-Way Radio Industry

For full details—write Dept. 2286-OG

Motorola Systems Are In and Working for These Companies:

Pacific Power and Light Co., Portland, Ore.
Brazos River Electric Transmission Cooperative, Waco, Tex.
Illinois Power Co., Decatur, Ill.
Central Illinois Public Service Co., Springfield, Ill.
Pan American Pipeline Co., Houston, Tex.
Shell Pipeline Co., Houston, Tex.
Panhandle Eastern Pipeline Co., Kansas City, Kans.
Mid-Valley Pipeline Co., Longview, Tex.
Southern Counties Gas Co., Los Angeles, Calif.
*La Fourche Telephone Co., Golden Meadow, La.
*Greenwood Telephone Co., Greenwood, So. Car.
*Santa Fe Telephone Co., Melrose, Fla.
*Middle South Utilities, Pine Bluff, Ark.
*Bonneville Power Administration, Chehalis, Wash.
*Sinclair Pipeline Co., Independence, Kans.
*Freeport Sulfur Co., New Orleans, La.
*Texas Electric Co., Ft. Worth, Tex.
**West Coast Telephone Co., Everett, Wash.
U. S. Atomic Energy Commission
**Dayton Power & Light Co., Dayton, O.
**Southern California Edison Co., Los Angeles, Calif.

—with 20 additional systems under construction

Motorola Microwave
Motorola Communications & Electronics, Inc.
A SUBSIDIARY OF MOTOROLA, INC.
900 N. Kilbourn Ave., Chicago 51, Illinois
Rogers Majestic Electronics Ltd., Toronto, Canada

SHATTERS LESS WHEN PERFORATED!

50% POZMIX – 50% CEMENT
BY ABSOLUTE VOLUME
CURED 3 DAYS AT 100°F.

0% POZMIX – 100% CEMENT
BY ABSOLUTE VOLUME
CURED 3 DAYS AT 100°F.

HALLIBURTON'S POZMIX CEMENT

RESILIENCY PERMITS GREATER PENETRATION!

One strong factor accounting for the growing use of Pozmix is its greater resiliency. This quality permits deeper penetration when perforating . . . and greatly minimizes shattering.

Halliburton's Pozmix – an exclusive blend of pozzolanic materials and neat Portland Cement – grows stronger as it ages, ultimately approaching or exceeding the strength of straight cement slurry. But its early strength is lower, allowing deeper penetration with less cracking.

That's just one of the big benefits provided by Pozmix. Other advantages that set it apart from ordinary cements include its increased resistance to sulfate attacks and corrosive waters; its lower density and lighter weight; superior tensile and compressive strength, and low heat of hydration.

Yet Pozmix actually costs less

This outstanding slurry can provide you with improved cementing . . . for longer casing life. Call for Pozmix next time. Phone your nearby Halliburton representative. Or contact Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

HALLIBURTON

YEARS AHEAD IN OIL WELL CEMENTING!

This is Why the Nash is the Most Simple Compressor

It's the Nash!

There are no mechanical complications in a Nash Compressor. A single moving element, a round rotor, with shrouded blades, forming a series of buckets, revolves freely in an elliptical casing containing any low viscosity liquid. This liquid, carried with the rotor, follows the elliptical contour of the casing.

The moving liquid therefore recedes from the rotor buckets at the wide part of the ellipse, permitting the buckets to fill with gas from the stationary Inlet Ports. As the casing narrows, the liquid is forced back into the rotor buckets, compressing the gas, and delivering it through the fixed Outlet Ports.

Nash Compressors produce 75 lbs. pressure in a single stage, with capacities to 6 million cu. ft. per day in a single structure. Since compression is secured by an entirely different principle, gas pumping problems difficult with ordinary pumps are often handled easily in a Nash.

Nash simplicity means low maintenance cost, with original pump performance constant over long periods. Data on these pumps sent immediately on request

No internal wearing parts.

No valves, pistons, or vanes.

No internal lubrication.

Low maintenance cost.

Saves floor space.

Desired delivery temperature automatically maintained.

Slugs of liquid entering pump will do no harm.

75 pounds in a single stage.

NASH ENGINEERING COMPANY

313 WILSON, SO. NORWALK, CONN.

WHAT'S NEW AT BRISTOL . . . . WHAT'S NEW AT BRISTOL

Meet the WORLD'S SIMPLEST INSTRUMENT SYSTEM!

It's Bristol's new METAGRAPHIC pneumatic transmission instrument system, for measuring, indicating, recording and controlling pressure, temperature, vacuum, flow, differential pressure and liquid level.

HERE ARE THE BIG ADVANTAGES OF THE NEW METAGRAPHIC SYSTEM:

1. SIMPLICITY – fewer parts, fewer adjustments, and less service required. Range changes can be made in seconds.

2. FLEXIBILITY – units can be combined like building blocks to make any kind of arrangement.

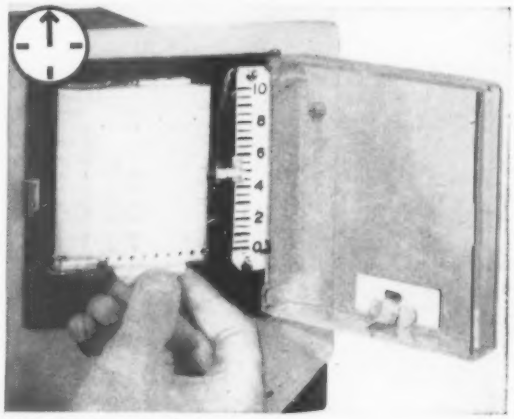
3. TRUE PLUG-IN SERVICE—results in great savings in installation costs; units can be plugged in or out without stopping process or control.

4. NO TIME LAGS—in a four-pipe circuit the transmitter signal and controller-output signal travel around a short loop—as small as three feet.

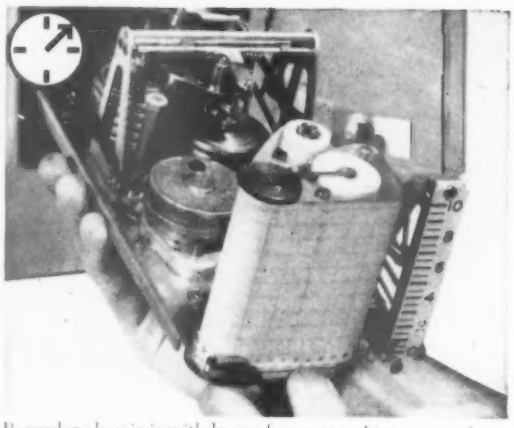
Get the whole METAGRAPHIC story by writing to The Bristol Company, 120 Bristol Road, Waterbury 20, Conn.

LOOK FOR OUTSTANDING NEW DEVELOPMENTS FROM BRISTOL.

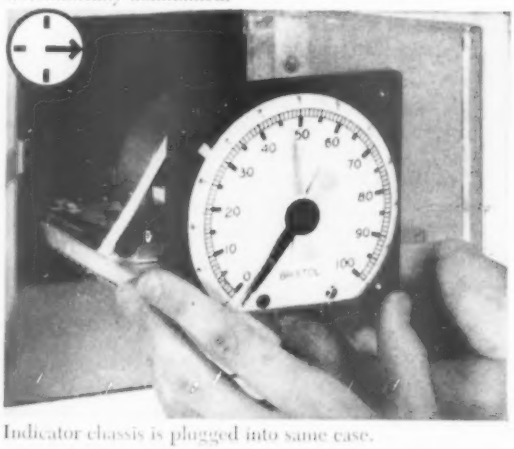
***It takes only fifteen seconds to* change the Bristol METAGRAPHIC recorder to an indicator!**



Case door is opened.



Recorder chassis is withdrawn from case. Air pressure is automatically maintained.



Indicator chassis is plugged into same case.

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Baroid's modern research and development program enables scientists and engineers to anticipate and solve many drilling problems. The solutions provide improved products and better techniques for drilling fluid control.

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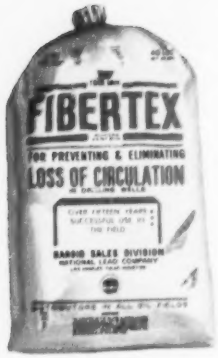

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They Say—

Iran Unsafe for U. S. Money

"President Eisenhower has answered the plea for immediate financial assistance made by Iran's Shah Mohammed Riza Phlevi. The aid will help the new government pull itself out of the morass made by Premier Mossadegh. Iran was in debt at home and abroad. Mossadegh's only way out was to make a deal with the Communists.

"This would have harmed not only Iran, but the West. Whether the aid pledged by the President will save Iran no one can really say. There is no telling what may happen, because Iran's politics and economics are built on the quicksands of fanaticism and emotionalism. It is, for many reasons, the place where our money can never be considered safe, where our good will will always be regarded as some sort of economic imperialism.

"Nevertheless the President took the sensible course.

"We can only hope the effort proves worthwhile."

From an editorial in Business Week.

Gas Consumers in Squeeze Play

"Many oil companies having large reserves of gas have refused to sell them at all. This matter seemed resolved favorably by the Federal Power Commission, when it ruled in the case of Phillips Petroleum Co. that it did not have jurisdiction over its gas production, but consumer states carried the case to a court of appeals where the commission's decision was reversed.

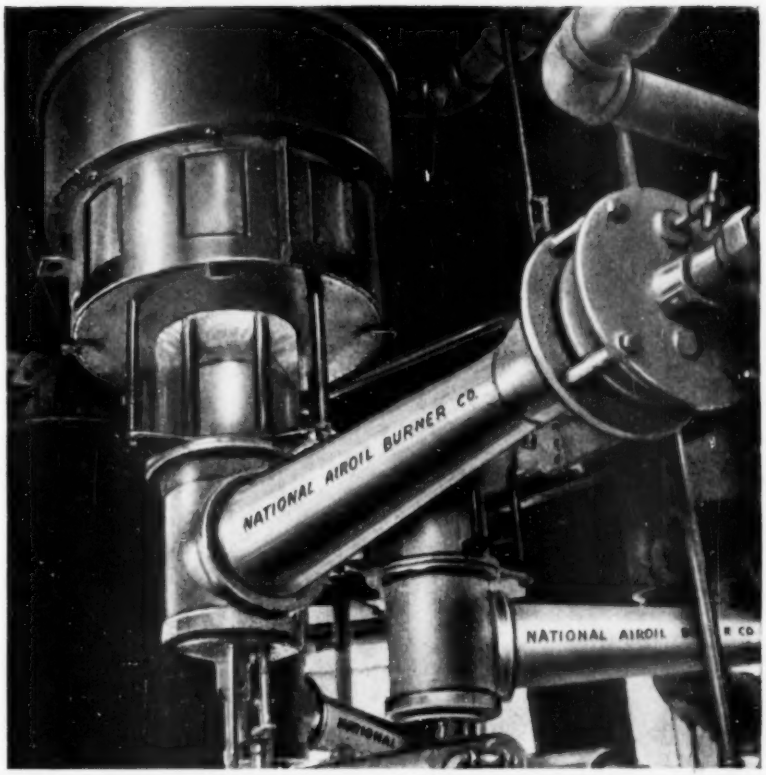
"This action by the consumer states seems to be diametrically opposed to the interests of the consumers who, I feel sure, would rather have adequate supplies of gas at fair prices for a long time. The other alternative would be less and less gas at low prices."

Robert W. Hendee, president of Colorado Interstate Gas Co., addressing a joint meeting of the Sons of the American Revolution and Rocky Mountain Gas Association, Denver.

GOP Wants No Government Industries

"The administration and the Congress have decided to sell the government-owned plants for making synthetic rubber. There was a national defense reason in the war to construct them. There is no reason for Uncle Sam to own and operate them now.

"The administration also felt that



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Oil-Gas Tandem Combustion Units

Exclusively for vertical firing, the new National Airoil VERTICAL Tandem Block Units retain all the features of our regular, well known Tandem Units . . . *plus*: special, pre-cast refractory shapes for easier, cost-saving installation and maintenance; secondary air inlet louvres for positive control of flame pattern; and, all steel duplex detaching gear which enables swift, simple burner changeover.

VERTICAL Tandem Units hold air in the combustion zone until fuel and heated air are thoroughly mixed. This means that ignition takes place in a hot zone; the result: high fuel economy through more rapid combustion with a minimum of excess air. NATIONAL AIROIL'S patented Tandem Combustion Blocks allow secondary air to be easily and accurately controlled. By adjusting air control louvres, flame can be shaped to radiate heat uniformly without tube impingement.

The VERTICAL Tandem Unit is always fired with NATIONAL AIROIL Combination Oil and Gas Burners . . . has a high turndown ratio with a steady flame . . . maintains required flame temperature using either fuel oil or gas. With the TANDEM UNIT'S clean flame, a cold furnace can be brought to full capacity in a short time.

"Many, many more hours *on stream*, without shutdown" . . . yes, YOU will realize higher profits from YOUR heaters when National Airoil VERTICAL Tandem Units are specified. Our new literature is yours for the asking.

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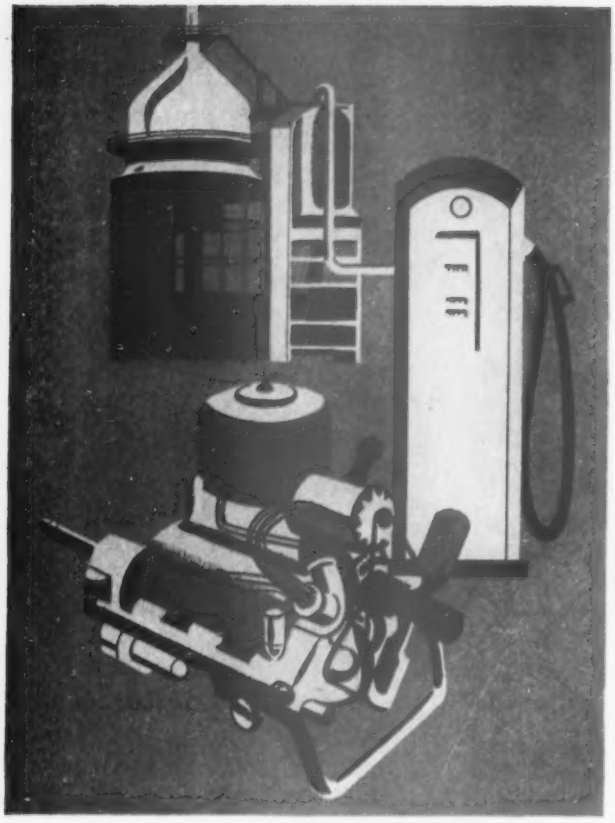

Need Octane?

REFINERS NO LONGER NEED TO BUY THE HIGHEST PRICED CRACKING CATALYST TO GET THE MAXIMUM OCTANE IN CAT-CRACKED GASOLINE. WITH FILTROL SR CATALYST, THE F-1 CLEAR OCTANES EQUAL OR BETTER THOSE PRODUCED BY ANY COMMERCIAL CATALYST AT ANY PRICE.

TYPICAL COMPARISONS ON C_5—400°F. ARE SHOWN BELOW:

CATALYST	FILTROL SR		SYNTHETIC SILICA-ALUMINA	
CRUDE	TCC EAST TEXAS	FLUID MID-EAST	TCC EAST TEXAS	FLUID MID-EAST
CONVERSION	56	55.5	56	55.5
OCT. NO.				
F-1 CLR.	92.6	91.9	91.8	92.0
R.V.P.	6.3	6.7	6.4	6.8

OTHER
REASONS FOR USING
FILTROL CATALYSTS

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2. High butylene yield
3. Low cost
4. Sulphur resistant catalysts
5. Faster regeneration rate
6. Varied plant facilities
7. Uniformity
8. Technical assistance
9. Low attrition rate

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*T. M. REG. U. S. PAT. OFF.

there was no more reason for the federal Government to take oil lands covered with water away from the states than there was to take any other land that belonged to the states.

"We believe every one of these acts benefits the public.

"In spite of the fact that the welfare clause of the Constitution has been stretched to distortion in recent years, this country still is less directed and less circumscribed by the limiting factors of central government than any other.

"It is our purpose to keep it so. It is our aim to reverse the 20-year trend towards centralization. It is our determination to give a break to the owners and workers of private enterprise."

Sinclair Weeks, Secretary of Commerce, addressing the fall meeting of the National Industrial Conference Board, New York.

Gas Industry Makes Great Strides

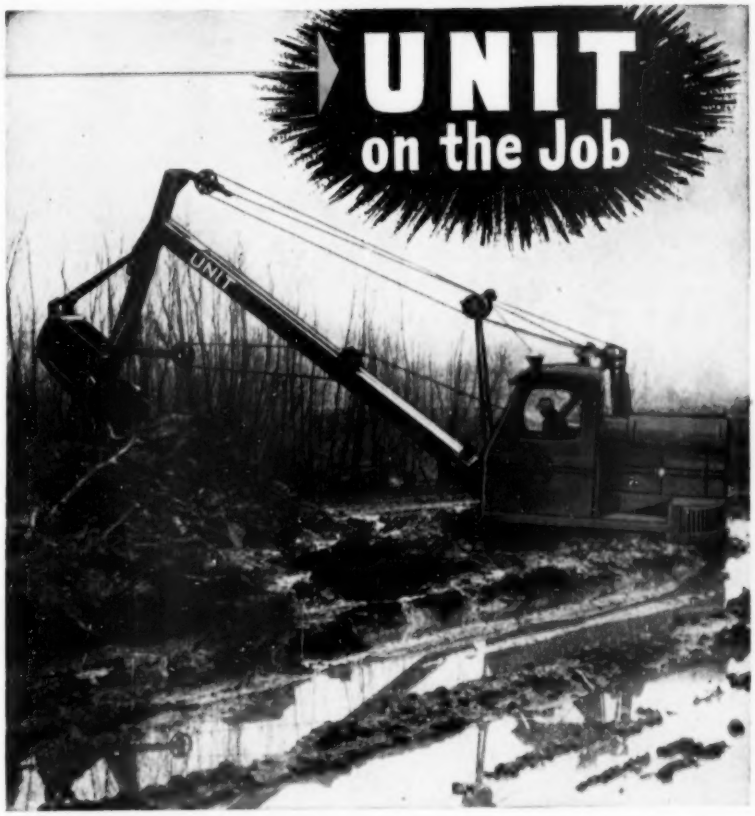
"Under the capitalist system, the gas industry has been able to pay moderate dividends, improve equipment, sustain technological advancement and keep strong and dynamic for the purpose of better serving the public. As an industry we have stood for a fair price and high standards of service. Our customers have gained in terms of declining price, improved service, and a ready expansion of facilities to meet the consumers' developing needs.

"Since the early twenties and particularly since 1940, there has been an enormous development of the gas-transmission network throughout the nation. The Pacific Northwest is the only remaining major area not served by natural-gas pipe lines. The Federal Power Commission is currently hearing the applications of two would-be suppliers of this area."

James C. Moulton, president of the Pacific Coast Gas Association, addressing the sixtieth annual meeting of the association, San Francisco.

South American Enigma

"It will be a continuing source of wonder to North Americans that President Peron of Argentina should on the one hand make friendly gestures toward the United States and on the other do things which necessarily shock American opinion. The latest of many incidents has been the arrest and imprisonment of Manuel V. Ordonez, noted attorney and Catholic layman, who happens to be the defense lawyer representing the owners of the great Buenos Aires newspaper La Prensa, which was



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BAKERSFIELD, CALIF.—The deepest oil wel
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County Land A 72-4, in the Palo
rd well, which has alre
ark, is being drilled

Drilling below 20,600 feet, the rotary table of this National 125 is driven with independent power. Twin GMC 671 engines, equipped with a Twin Disc Model F Torque Converter, drive through an Oilwell Reduction Gear.

Oil observers closely watching the deep wildcat credit the Twin Disc Torque Converter, as key equipment in eliminating "twist-offs," for making possible this world depth record. "No rig," they contend, "should be without the Twin Disc Torque Converter."

Five Twin Disc Model EH Clutches are also on this rig: Two on twin clutch set-up to compound and C-250 pump; one from pump compound to C-250; one on tail pump drive to C-350 pump; and a Model EH Master Clutch.

Twin Disc Torque Converters

Throughout the oilfields, operators report cheaper, faster hole from Twin Disc Torque Converter-equipped rigs. Automatic multiplication (up-to-6 times) of engine torque through these fluid drives, matches load demands . . . results in less shock on engines, drives, chains, drill pipe . . . less downtime.

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

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seized by Peron more than 2 years ago.

"The news of Dr. Ordonez' arrest has permeated the free world, but has not been published in Argentina and is known only to a circle of friends and relations.

"At the very time that Dr. Milton Eisenhower was being warmly embraced and lavishly entertained by General Peron many thousands of political prisoners were languishing in jail; freedom of press, speech, and assembly had been abolished; the liberal Constitution was a dead letter; Congress had become a rubber stamp, and one man —Juan Domingo Peron—was ruling Argentina with clumsy ruthlessness."

Editorial in the New York Times.

Compulsory Unitization Dangerous

"Let no one imagine that the independents are unaware of the methodical grinding of compulsory unitization machinery. The careful long-range planning behind the gradually intensifying efforts of some to impose the dangerous doctrine of 'absolute correlative rights' has not escaped our attention.

"We cannot deny that some inroads have been made.

"In most such cases, we are denied a head-on battle with those seeking to use every conceivable situation as an excuse for advancing compulsory unitization. But the real fight will fall in the Texas Legislature as soon as proponents of a compulsory law are ready to test their strength again. It is there they must go before they can really accomplish the objective of police powers to back up the advantages a forced polling arrangement provides the larger companies."

M. D. Bryant, president of the Texas Independent Producers & Royalty Owners Association, in the association's publication TIPRO.

CALENDAR OF EVENTS

OCTOBER

4- 6 American Association of Oilwell Drilling Contractors, thirteenth annual meeting, Cosmopolitan Hotel, Denver.

5- 7 Petroleum Electric Power Association, silver anniversary meeting, Muehlbach Hotel, Kansas City.

6- 7 Texas Mid-Continent Oil and Gas Association Rice Hotel, Houston.

7- 9 National Association of Corrosion Engineers, south central region, Mayo Hotel, Tulsa.

8- 9 California Natural Gasoline Association, annual fall meeting, Ambassador Hotel, Los Angeles.

11-17 Oil Progress Week.
12-16 Short course on cathodic protection, University of Illinois, Urbana.
16-18 New Mexico Geological Society, fourth annual field conference, El Paso, Tex.
19-21 American Institute of Mining and Metallurgical Engineers, petroleum branch, fall meeting, Dallas.
19-20 Independent Petroleum Association of America, annual meeting, Texas Hotel, Fort Worth.
19-23 National Safety Congress, annual meeting, Hotels Conrad Hilton, Congress, Harrison, and Sheraton, Chicago.
21-23 Gulf Coast Association of Geological Societies, third annual convention, Captain Shreve Hotel, Shreveport.
22 American Institute of Chemical Engineers, New York section, symposium, Hotel New Yorker, New York.
22-23 Western Petroleum Refiners Association, regional meeting, Garrett Hotel, El Dorado, Ark.
23 Natural Gasoline Association of America, regional meeting, Blackstone Hotel, Tyler, Tex.
26-28 National Lubricating Grease Institute, Edgewater Beach Hotel, Chicago.
26-29 American Gas Association, annual conference, Kiel Auditorium, St. Louis.
27 Institute of Gas Technology, annual meeting, Chase Hotel, St. Louis.
27 Association of Consulting Chemists and Chemical Engineers, Inc., annual meeting, Hotel Belmont Plaza, New York City.
28-30 Seventeenth Technical Conference on Petroleum Production, Mineral Industries Building, Pennsylvania State College, State College, Pa.
29-31 Rocky Mountain Oil and Gas Association, annual convention, Cosmopolitan Hotel, Denver.

NOVEMBER

3- 4 Society of Automotive Engineers, national diesel-engine meeting, Conrad Hilton Hotel, Chicago.
5- 6 Society of Automotive Engineers, national fuels and lubricants meeting, Conrad Hilton Hotel, Chicago.
5-6 American Association of Petroleum Geologists, Pacific section, Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists annual joint meeting, Hotel Biltmore, Los Angeles.
9-11 Geological Society of America, annual meeting, Royal York Hotel, Toronto, Ont.
9-12 American Petroleum Institute, annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
12-13 Society of Exploration Geophysicists, midwestern meeting, Adolphus Hotel, Dallas.
19-20 National Association of Corrosion Engineers, western region, fall conference, Biltmore Hotel, Los Angeles.
19-20 Annual Instrument Short Course, Los Angeles Harbor Junior College, applied technology division, Wilmington, Calif.
20 Natural Gasoline Association of America, regional meeting, Herring Hotel, Amarillo, Tex.
Nov. 29-Dec. 2 American Society of Mechanical Engineers, Statler Hotel, New York City.

DECEMBER

1- 4 Corrosion conference, University of Oklahoma, Norman.
13-16 American Institute of Chemical Engineers, annual meeting, Hotel Jefferson, St. Louis.

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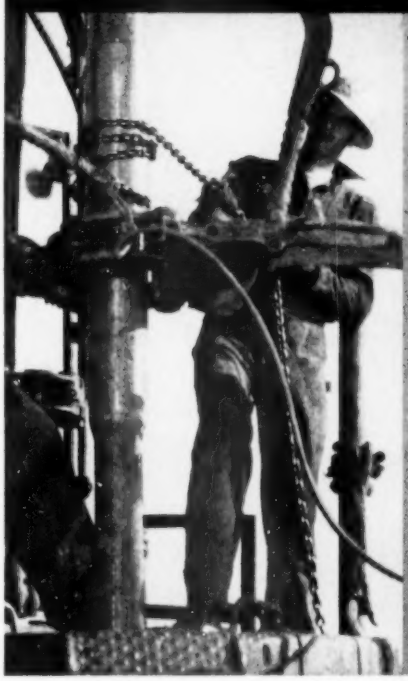
TAYLOR MADE
ALLOY STEEL
SPINNING CHAIN!



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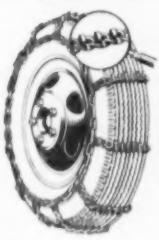
The superiority of Taylor Made Alloy Steel Spinning Chain over Hi-Test types is causing smart drillers everywhere to specify this famous new chain. Its short stubby links assure better grips. The fact that it's made from Taylor's *special analysis alloy steel* assures you of great strength, terrific resistance to cold working, grain-growth and shock at low temperatures. Hardness (Rockwell 265-285) reduces wear. Complete and controlled heat-treatment removes the need of periodic annealing. Available in $\frac{1}{4}$" ($\frac{9}{32}$" actual size) and $\frac{5}{16}$" ($\frac{11}{32}$" actual size). *Call your supply store today!*



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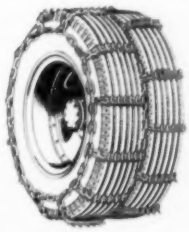

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JOURNAL
TULSA, OKLAHOMA

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JOURNALLY Speaking

Really Independent

WHAT'S an "independent" in the oil business? The term is constantly used by everybody, and yet it's hard to get any generally acceptable definition.

Some light is thrown on this problem by a note that one of our subscribers appended to the card which our circulation department uses to record the occupational classifications of our readers.

"An 'independent geologist' is one who runs his own oil to a pipe line as a result of his own efforts," he wrote. "A 'consulting geologist' is one out of a job."

This man crossed out the word "consulting" on the card and wrote in "independent" as his own classification. We congratulate him on his change of status.

Apparently it is this man's view, doubtless based on personal experience, that to have validity the word "independent" should be preceded by "financially." That's a mighty happy condition if it can be attained, but it doesn't completely answer the question of what is an independent. It doesn't distinguish independents from majors. And doubtless many a operator still considers himself an independent even though he is deeply in hock to the bank.

Unwritten Letter

BY a coincidence, we had just finished dashing off the above squib when we came across a press release announcing the formation of a new alphabetical agency in the federal Government. We had hoped that the day of new agencies was past, but apparently not.

This new outfit is being set up to help small business units. The press release said that small business needs financial assistance, technical consultation, and aid in getting contracts from the Government and from big business. An accompanying letter asked editors how the agency could apply this program to their industries.

Our impulse was to write this fledgling bureaucrat a mean, nasty letter about independents and independence in the oil business. But we decided that would be impolite and impolitic, so dropped the idea. But if we had written such a letter, the first draft would have gone something like this:

"Dear Sir: In the oil industry a small business unit is known as an independent, and an independent operator is one who stands on his own two feet and doesn't ask for help from the Government

"We don't know about other industries, but in the oil business all that the small units ask of their Government is to provide a political and economic climate that will give them a sporting chance to grow into big units through their own resourcefulness.

"An independent oil operator doesn't want a government loan, and if his operations are so shaky that he can't borrow from a private lending institution that knows the oil business then his venture is no place for the taxpayers' money to be invested. The oil industry was built on risk capital, and there will be plenty of that available if the tax laws are changed to permit a man to keep a fair share of whatever he is lucky enough to make.

"As for technical consultation, the independents don't want any beyond the regularly available services of established agencies. No independent would take the advice of a government expert on where to drill a wildcat. Most independents wouldn't touch a government contract with a 10-ft. pole because of all the red tape and delays, and they don't need any government intervention to protect them in the many dealings they have with the big operators.

"In fact, in this industry the independents usually are able to run rings around the big companies because they can move more quickly. As long as the system is kept competitive and the rules of the game are kept honest, independents don't need government help in fighting the big companies.

"Sorry, Mr. Administrator, but if small oil operators asked for government assistance they couldn't call themselves independents any more."

—Henry D. Ralph.

How's This for an OS&D

ENGINEERING DATA

TUBE: Nonporous, smooth bore tube drains clean, cuts frictional resistance and turbulence . . . patented bonding method "welds" tube to carcass—*tube cannot pull loose.*

CARCASS: Primary and secondary carcasses made of multiple plies of specially woven, high-tensile duck with high-tensile, round steel wire imbedded in the rubber . . . flexible enough to overcome stretch and stress.

COVER: Specially made with extremely tough synthetic compound to resist abrasion, sun-checking and the corrosive action of salt water.

FITTINGS: Nipples of steel or aluminum integrally built into the hose by patented Hewitt Durabond process . . . Nipples anchored to hose by rings welded on the nipples and layers of high-tensile steel wire in the wall structure of the hose. This seals against leakage . . . eliminates need for external clamps.

I.D.: 2", 3", 4", 6", 8", 10" & 12".

BENDING RADIUS: Minimum safe bending radius in service equals 1 foot to 1 inch of hose I.D.

WORKING PRESSURES: Up to 200 psi

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EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Hose Performance Record?

Customer's Performance Record

EQUIPMENT:

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LOCATION:

Union Oil Company's Port San Luis Wharf, Avila, California.

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Loading crude oil into sea-going tankers.

LOADING CONDITIONS:

Loading conditions are so severe that tankers must be held some 75' to 100' away from the dock with the aid of 4 heavy mooring buoys plus the ship's anchor while loading in heavy seas. This is necessary because the dock faces directly on the ocean without harbor or breakwater protection and the dock itself extends approximately one-half mile from the shore line.

PERFORMANCE:

Due to the rugged service encountered, normal minimum life expectancy for loading hose at this installation is 15,000,000 barrels. To date, 37,000,000 barrels have been handled by a single line of Hewitt-Robins Smooth Bore OS&D Hose.

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED HEWITT-ROBINS HOSES FOR YOUR OPERATION, OR CALL YOUR HEWITT RUBBER DISTRIBUTOR

(See "RUBBER PRODUCTS" Classified phone book)

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Baker Drill Pipe Float Valve

SIDE SEALS REVERSED

to prevent distortion of seals by trapped fluid. Valve is easily removed.

MORE EFFECTIVE SEAL

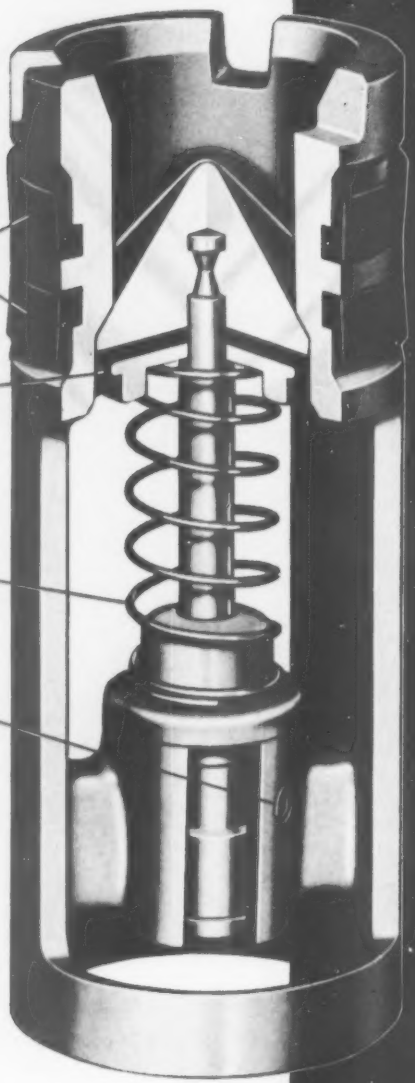
The redesigned seal between the valve and the valve seat seals better—lasts longer—*stays in place* even under high circulating volumes and high pressures.

LESS SPRING TENSION

Reduces the cutting action of circulating fluid on the valve seal and seat.

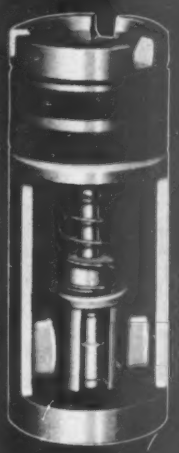
GUIDE POSITIVELY ANCHORED

The valve guide is securely held in place by the set screw.



New!

BAKER MODEL "F" DRILL PIPE FLOAT VALVE



Baker Model "F" Drill Pipe Float Valve, Product No. 4813

Suggestions of drilling contractor and drilling department personnel have helped in redesigning and improving Baker Drill Pipe Floats so that they are *now better than ever*. They will save *you* time and money, muss and fuss, in every string.

POSITIONED WHERE DESIRED—A majority of operators install the Baker Drill Pipe Float Valve in a recess in the lower end of the drill collar where it is held in position by the pin on the drilling bit. Or the Valve can be positioned in a Drill Pipe Float BODY which serves as a tool joint sub at any point in the string.

EASILY INSTALLED AND SERVICED—The strong, simple Valve is made without threads and is merely dropped into place—or just as easily removed—by hand. No tools or wrenches are required. The inexpensive wearing parts are available at your supply store, and servicing is quickly and easily done right on the derrick floor.

The Baker Drill Pipe Float does so much; saves so much; and costs so little that we suggest you...

PICK ONE UP AT YOUR SUPPLY STORE—TODAY

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OIL TOOLS, INC.

HOUSTON · LOS ANGELES · NEW YORK

Gas is no longer a salvage business

COLUMBUS discovered America by accident while looking for India, and it was a long time before the world realized the value of his discovery.

Drillers discovered natural gas by accident while looking for oil, and it was a long time before the world realized the value of their discovery.

The Old World treated the Americas like stepchildren, to be controlled, regulated, and exploited. It was not until the various colonies rebelled and became free and independent that they began to grow to greatness in their own right.

Natural gas is still being treated like a stepchild of the oil industry. Professional champions of what is alleged to be the consumers' interests seek to control, regulate, and exploit it.

TODAY, gas producers are near the point of rebellion. They are pointing out that unless the producing end of the gas business is left free and independent there will be little gas for the regulators to regulate.

The reason for this is clear. The demand for gas is so great that the needs can no longer be supplied with gas discovered by accident. More and more, future needs will have to be supplied by gas deliberately sought for and produced. And nobody is going to hunt for and produce gas unless he has a fair chance of getting his money back.

The early gas-transmission pipe lines were opportunists. They picked up distress gas at salvage prices, developed markets for it, and started a new industry. They succeeded so well that the gas they once could get almost for the taking is now highly valuable and much sought after.

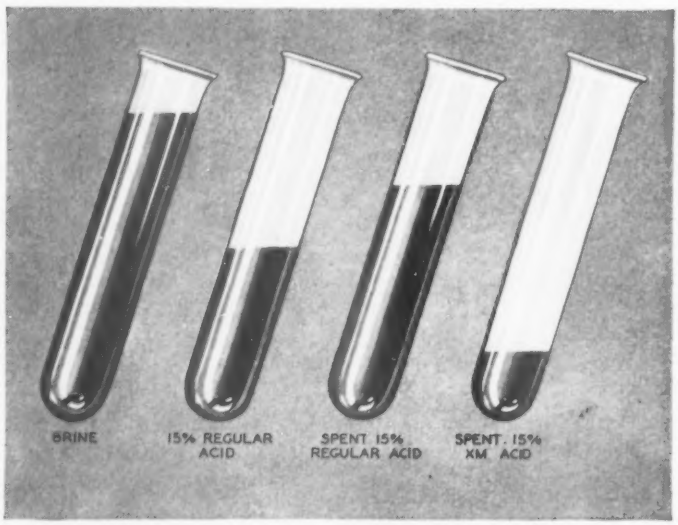
IT is hard for these pioneer lines to realize that they now must pay 5 or 10 times as much for gas as they did 10 or 20 years ago. It is even harder for consumers and regulators to realize this. But the market value of any commodity is bounded by what consumers will pay for it and what producers will take for it, and the historic fact that it may have been virtually valueless at one time has little bearing on the case.

The hardest thing of all for would-be regulators to realize is that the return to producers for the risks of exploring for and developing gas reserves cannot be measured by the arithmetic of public-utility rates, and that producers will not go after gas unless they are free and independent of regulation.

If the present campaign to regulate gas production as a utility is successful, consumers will have to get along on whatever gas is discovered by accident, for there will be no inducement to develop gas for its own sake.

GET MORE PRODUCTION FROM YOUR ACIDIZING

Acid treatments can be tailored to formation characteristics by using Dowell addition agents



This drawing illustrates the swelling-control effect of XM Acid on silicates. The same quantity of silicates has been placed in each of four different solutions. Note the relative volume occupied by the silicates in each case.

Successful acidizing is more than just a matter of pumping acid into a well. The real pay-off in increased production comes only when the *right* chemicals are used.

Yes, acids *are* different. By adding selected chemicals to the basic acid, treatments can be tailor-made to fit formation characteristics. Dowell . . . pioneer in acidizing . . . offers you a wide selection of these *addition agents* and the expert knowledge to determine the right combinations.

For example, Dowell XM Acid is designed to reduce the swelling of silicates of the clay type minerals found in certain dolomite and limestone producing formations. This silicate swelling, during conventional acid treatments, can delay well clean-up and actually reduce oil production.

A well completed in a dolomite formation known to contain swelling silicates was producing 15 BOPD. A Dowell XM Acid treatment boosted production to more than 80 BOPD . . . an increase much higher than could be expected with ordinary acid. After 60 days, production had leveled off at 60 BOPD. Treatment payout time was estimated at 3 days.

Other Dowell addition agents are designed to remove mud from producing formations; to speed reaction rate; to prevent emulsions; to remove "gyp"; to increase penetrating ability; to trace fluid movement; to increase acid weight.

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ON DOWELL ADDITION AGENTS

For more detailed information on Dowell Addition Agents, call your nearest Dowell station or write direct to Tulsa, Dept. J 11.

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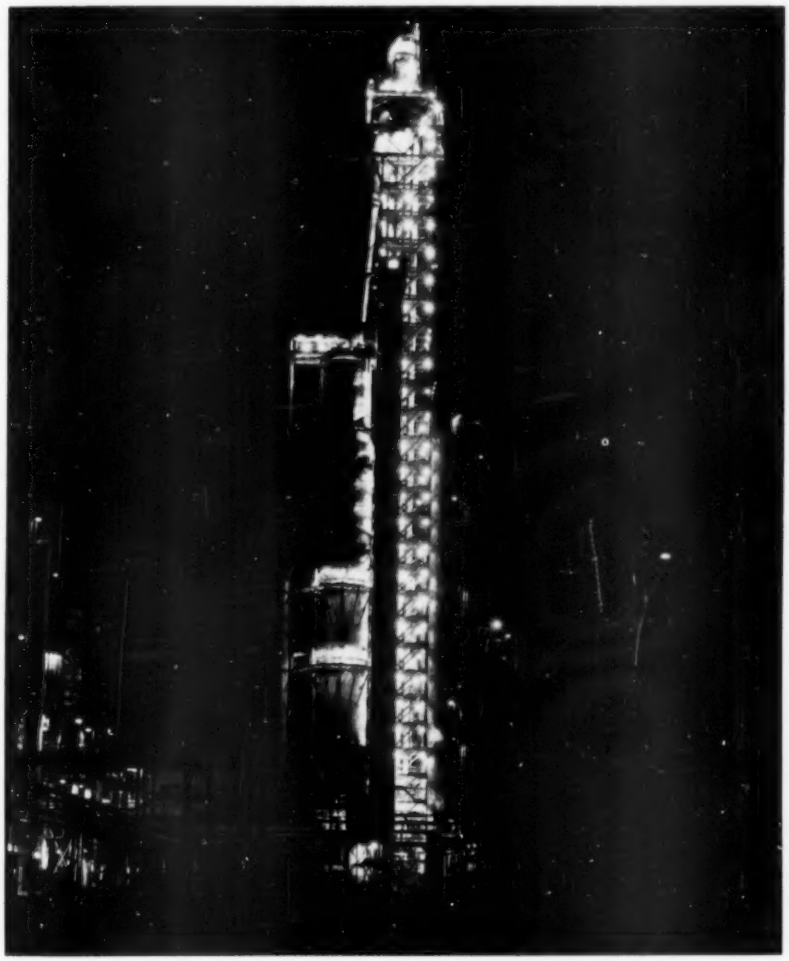
"First in Oilfield Acidizing . . . Since 1932"

Look to DOWELL

FOR OIL INDUSTRY CHEMICAL SERVICE

THIS WEEK... ...IN THE NEWS



WORLD'S LARGEST Houdriflow catalytic cracking unit—with a 19,000-bbl. daily capacity—went on its shakedown run at the Texas City Refining Co.'s refinery last week. The new unit is expected to reach capacity soon and will give the plant a wider range of products and more versatility in its operation. The unit will make more components of high-octane gasoline and domestic furnace oil available from low value residuals.

INTERNATIONAL — Crude production in the oil fields of the Free World dropped during July for the first time in 4 months. . . . The decline was only 9,500 bbl. daily and left the July average only slightly below the record 12,044,700 bbl. daily in June. . . . In spite of the general decline, foreign production actually made a slight gain, but it was offset by a decline of production in the United States. . . . ¶Iranian Government tells its people the sad state of its nationalized petroleum industry. . . . In a report to the nation, Iran admits a deficit of $28,700,000 and a loss of revenue of at least $200,000,000 since nationalization in May 1951.

INDUSTRY—A much lower crude-producing rate will prevail in October. . . . Following Texas' lead in cutting the flow, Oklahoma, Kansas, and Louisiana order reductions. . . . Kansas takes most drastic action, orders complete shutdown for 10 days of all wells except those in secondary-recovery projects and these must cut production. . . . ¶Prestressed concrete valuable for construction of storage tanks, holds unusual possibilities for economy, A.S.M.E. meeting told. . . . ¶Conservation efforts by the oil industry and what they mean to the public will be the theme of Oil Progress Week, which opens throughout the nation October 11. . . . Lube-oil output outside the United States and Iron-Curtain countries next year set by PAD at 53,100 bbl. a day, up nearly 20,000 bbl. over 1952.

NATURAL GAS—Free field prices urged as a means of encouraging needed exploration. . . . Speakers at I.N.G.A.A. meeting agree future supply will not meet demand if regulation by government continues or increases. . . . ¶Sunray places in operation its new compressor station, providing a market outlet for gas production in Mustang Island and Redfish Bay fields. . . .

PIPE LINES—Government idea for huge defense crude line from Gulf Coast to the Eastern Seaboard generally criticized roundly by members of the NPC at the council's fall meeting. . . . ¶Gulf Research & Development perfecting new instrument which locates interfaces in crude or products lines by measuring the dielectric constant of the fluid. . . . ¶New method said to be faster and more reliable. . . . ¶Tough terrain in Coquihalla Pass delays final linking job on big Trans Mountain crude trunk. . . . First deliveries at Vancouver now scheduled for October 15. . . . ¶Salt Lake Pipe Line Co. to deliver first products at Spokane this week over new 135-mile, 8-in. extension of its system from Pasco, Wash. . . .

TRENDS—Refinery runs were cut 336,000 bbl. daily in the 2-week period ended September 26. . . . Compared with the average for the 6-week period ended September 12, runs for the week of September 26 were down 277,000 bbl. daily. . . . Total reduction includes cuts of 15,000 bbl. daily in District 1, 186,000 bbl. daily in District 2, and 105,000 bbl. daily in District 3. Districts 4 and 5 increased 8,000 and 21,000 bbl. daily respectively. . . .

ACTIVITY—Production of crude and lease condensate averaged 6,458,850 bbl. daily for week ended September 26, up 6,350 bbl. daily. . . . ¶Total well completions increased 82 wells for the week to 1,045. . . . ¶Wildcat completions decreased 20 wells to 221. . . . ¶Rotary rigs operating in the United States increased 18 rigs for week ended September 28 to 2,635. . . .

New Interface Detector

Gulf Research perfecting device which "fingers" changes in crude or products streams by measuring conductivity

HOUSTON.—A new instrument now undergoing field tests was described here last week as a faster and more sensitive method of locating interfaces in crude or products lines.

The device uses an entirely different approach. It locates the interface by measuring and recording changes in the dielectric constant of fluid flowing through the pipe line.

It is being developed by Gulf Research & Development Co., Pittsburgh. Work so far on the project was described by the company's Howard J. EnDean and Robert M. Howard at the eight annual Petroleum Mechanical Engineering Conference of the American Society of Mechanical Engineers.

Changes in the dielectric constant of fluids flowing through the line are sensed by concentric cylinder-type capacitors or "probes." These actuate a recording device which notes changes in capacitance on a chart.

Where the dielectric constants of two products are nearly the same, the interface can be accentuated by injecting several barrels of a third product with a different constant when the fluids enter the line.

B.s. and w. also can be detected in the stream since its presence changes the dielectric constant of the fluid. This too is noted on the chart.

Test results . . . The practicality of the instrument was proved, the authors said, in an experimental field test using five different types of gasolines, kerosine, and No. 2 fuel oil.

During the tests, 19 product changes or interfaces between gasolines, kerosine, and fuel oil were recorded successfully.

The recordings were checked against results obtained using four other interface-determination methods—dispatcher's directive, color tests, hydrometer and color, and recording gravitometer.

The comparison, the authors said, showed that the "Gulf Products Batcher" was consistently at least 1 minute faster in detecting the interface than was the recording gravitometer and as much as 3 minutes faster than the hydrometer and color test. The new method also proved to be the only one of the five procedures sufficiently sensitive to detect all changes, they said.

Alerting devices . . . The detector alerts operating personnel to any change of product in the line by means of a light, housed in an explosionproof fitting, which flashes intermittently while the interface is passing.

The light can be supplemented with an additional alerting device consisting of a miniature indicator light, a gong, and a manually reset latching relay. When a change of product occurs, the latching relay is energized and activates the light and gong circuits until the operator resets it.

A switch can be inserted in the gong circuit to silence the gong and leave only the light as an alerting signal.

B.s. and w. content . . . A modified version of the instrument was installed in a crude line to make a continuous record of pipe-line oil b.s. and w. contamination.

Here an actuating device was added to control an automatic sampler attached to the bottom of the probe. The sampler is adjusted to thief the stream automatically at the rate of three samples per minute when contamination is in excess of the acceptable maximum percentage.

The individual samples are mixed and the resulting composite sample processed to determine the average percentage of contamination for the total period of sampler activation. In experimental field tests, the contamination content of the composite samples verified chart recordings, the authors said.

Crude-line adaptation . . . Investigations have indicated that the instrument, if suitably modified can be used as an interface detector in crude lines where crude is batched, provided that the contamination of crude by b.s. and w. is relatively constant.

EnDean and Howard said the instrument can be considered essentially developed from the physical standpoint but that much additional field work will be required to determine its limitations and the proper procedure for adapting it to automatic-control operations.

This field work is now in progress, they said, and it is expected that installation procedures for the instrument can be standardized soon and sufficient field data accumulated to define its limitations.

Concrete Tanks Urged

Huge savings are possible in spite of a higher initial cost, two Esso Standard men tell A.S.M.E. conference

F. Lawrence Resen

HOUSTON.—Prestressed concrete is an excellent material for storage-tank construction. Its advantages at least match those of steel and in most cases outweigh them considerably.

These conclusions were made by two Esso Standard Oil Co. representatives, J. S. Bell and D. R. DeVeaux, in a paper presented here last week before the petroleum division of the American Society of Mechanical Engineers.

The Esso men, from Linden, N. J., urged refiners to consider seriously the use of concrete in future construction. It has, they said, these advantages:

. . . Material savings: A prestressed tank would normally require only one-fifth of the steel needed in a steel tank.

. . . Land savings: Due to the corrosive nature of steel tankage and fire hazards involved, steel tankage must be widely spaced. Furthermore, it is very difficult to use steel in underground installations. Prestressed tanks, being relatively free from corrosion, may be placed at any level suitable and even may be placed one upon the other to utilize fully the land area available.

. . . Shock resistance: Considering the possibilities of earth tremors, prestressed tanks can be adequately constructed for general use. In addition, these tanks are considerably safer to adjacent tankage in the event of a fire and subsequent explosion.

. . . Fire resistance: Inherent fireproof characteristics of concrete permit spacing on a basis of maintenance requirements rather than upon fire-protection requirements. An internal tank fire would not cause sudden wall

Saved—One Expensive Well Head

When Sunray Oil Corp. drilled gas distillate wells in Mustang Island field, Corpus Christi Bay, specially designed steel caissons were installed at each well head to protect the wells from collision by small craft. This precaution has already paid off. Here is a view of one of the gas-distillate wells after it "collided" with small boat. Damage to the boat: Part of the hull and part of the cabin ripped off. Damage to the well head: One slightly scratched caisson and one bent flow line. The well went on producing. The boat limped to shore.

failure as would be expected in steel tanks. The prestressed tank, being an integral unit, should logically be considered as having little effect on the adjacent units.

... **Maintenance:** On the prestressed concrete tank there would be no corrosion problems and no painting problems and, assuming adequate design and construction, no repair for cracks.

... **Conservation:** A prestressed concrete tank can be built to withstand 2½ to 3 psi. internal pressure, which American Petroleum Institute findings sho v should eliminate 95 per cent of breathing losses.

... **Size limitations:** There is considerable evidence that the size of steel tanks is limited by present welding methods. While it seems certain that steel tanks should not be built larger than 250 ft. in diameter without new techniques, concrete tanks have already been constructed to diameters of 320 ft.

... **Lower costs:** Costs may be lowered through use of prestressed concrete. While the initial cost of a steel tank in the Bayway (Linden, N. J.) area is 90 cents per barrel and the concrete tank cost is $1.20 per barrel, the yearly costs of the concrete tank is actually lower since it has a 60-year life span, approximately double that of the steel tank.

With an interest rate of 4 per cent and a salvage value of the steel set at $5,000, the costs per year are $7,760 for steel and $8,000 for concrete tanks of 151,000 bbl. capacity. However, this cost of the steel tank is increased by an annual maintenance expense of $1,500 to $2,500. Maintenance costs of the concrete tank would average about $100 per year. On the basis of these figures, the annual costs of a steel tank would jump to $10,260 compared with $8,100 for concrete.

Costs for both types would drop in the Gulf Coast area where labor field costs are generally lower, but even in this region, the concrete tank would cost some 30 per cent less—about $6,000 annually against $8,900 for steel.

A more striking comparison is possible when breathing losses are thrown in with the general costs. On this basis, the savings in the use of concrete over steel jumps to 70 per cent, the authors said.

Disadvantages: While there are many advantages, Bell and DeVeaux also pointed out several less desirable characteristics. These included:

... **Lack of versatility:** Once a concrete tank is constructed, it must be considered immovable, for it cannot be floated nor dismantled for use at another site. Its salvage value is negligible and it is conceivable that certain tanks could become white elephants after 15 to 20 years due to a change in operations.

... **Construction difficulties:** Evolution of the prestressed concrete tank has been quite rapid, but has been hampered considerably by technical skill required. In addition, field construction techniques are highly specialized and labor problems critical. This has led to longer erection periods than for comparable steel tankage and thus has increased capital investment required. However, costs tend to decrease as more knowhow is gained and construction methods will probably be improved.

... **Repair difficulties:** Under normal conditions a prestressed tank should not crack. However, in event of failure, repairs may be difficult to make, with very large cracks possibly resulting in total loss. However, no concrete tanks constructed with the relatively new wire winding process have failed.

New Officers Named

A.S.M.E. production group elects O. L. Lewis head

HOUSTON.—The Petroleum Division of the American Society of Mechanical Engineers named O. L. Lewis of C. F. Braun & Co., Alhambra, Calif., 1953-54 chairman of its executive committee at the A.S.M.E.'s annual conference here last week.

Others elected to the committee included P. E. Frank, Sinclair Refining Co., New York, secretary; E. N. Kemler, University of Minnesota, Minneapolis, research secretary; M. A. Schiel, A. O. Smith Corp., Milwaukee; A. H. Newberg, Service Pipe Line Co., Tulsa; and J. S. Rearick, M. W. Kellogg Co., New York.

Appointments to other committees were as follows:

... **Transportation committee:** F. O. Stivers, Humble Pipe Line Co., Houston, chairman; C. H. Burnham, Panhandle Eastern Pipe Line Co., Kansas City, vice chairman; F. A. Sleif, Platte Pipe Line Co., Houston; and T. D. Williamson, Jr., T. D. Williamson, Inc., Tulsa.

... **Refining committee:** J. P. Mooney, Humble Oil & Refining Co., Baytown, Tex., chairman; H. W. Evans, Sinclair Oil & Gas Co., Tulsa, vice chairman; W. A. Sullender, Pan American Refining Corp., Texas City, Tex.; R. A. Harang, M. W. Kellogg Co., New York; and R. W. Meeklin, Standard Oil Co. (Ind.), Whiting, Ind.

... **Production committee:** Henry H. Meredith, Jr., Humble Oil & Refining Co., Houston, chairman; and W. P. Binger, Shell Oil Co., Tulsa, vice chairman.

... **Materials committee:** F. K Zerbe, A. O. Smith Corp., Houston, chairman; A. C. Bidwell, Esso Standard Oil Co., Linden, N. J., vice chairman; E. G. Newton, Atlantic Refining Co., Philadelphia; A. G. Barkow, Texas Illinois Natural Gas Pipe Line Co., Chicago; and G. E. Nevill, Cameron Iron Works, Inc., Houston.

. . . **Manufacturing committee:** Allen F. Rhodes, McEvoy Co., Houston, chairman; and A. A. Hardy, W. C. Norris Manufacturing, Inc., Tulsa, vice chairman.

. . . **Press committee:** Gera'd L. Farrar, The Oil and Gas Journal, Tulsa, chairman.

. . . **Advisory committee:** E. N. Kemler, chairman.

Surplus Causing Alarm

Kansas orders 10-day production shutdown, Oklahoma and Louisiana cut allowables sharply to halt stock buildup

OVERFLOWING crude and products storage led other major oil producing states last week to follow Texas' lead in slashing drastically crude-production allowables for October.

Conservation agencies of Louisiana, Oklahoma, and Kansas met with oil-company representatives September 29 to consider how much production should be cut to meet demands of crude-oil buyers. The Texas Railroad Commission at its regular meeting earlier in the month set the Texas allowable at 2,904,409 bbl. daily, whacking 101,034 bbl. daily off the original allowable for September.

Louisiana . . . At Baton Rouge, Conservation Commissioner John B. Hussey announced after a prolonged conference with oil-industry representatives at a special emergency meeting that the state's allowable for October would be cut 75,000 bbl. daily from the September figure of 703,735 bbl. daily.

The total cut included 19,697 bbl. daily shaved from the September figure at the conclusion of the regular monthly allowable hearing.

Kansas . . . By far the most drastic action was taken by the Kansas Corporation Commission which ordered a complete shutdown of 24,000 or 80 per cent of the state's wells for 10 days until the big surplus of crude stocks could be worked off.

The shutdown will be in effect from October 15-26. It is expected to reduce stocks by about 3,000,000 bbl. In addition to those wells completely shut in, October output of about 6,000 secondary-recovery wells will be cut one-third. These wells will be allowed to produce only because it would be ruinous to these wells to stop water-flood production entirely.

The commission's action was taken with the approval of most of the state's producers. General feeling among the operators was summed up by George Bruce, president of Aladdin Petroleum Corp., Wichita, who declared at the hearing that it was "time to take a realistic view of the situation and cut production—not just set lower allowables we can't enforce."

Oklahoma . . . In Oklahoma City, the Oklahoma Corporation Commission lowered the October allowable for the state to 485,000 bbl. daily—34,260 bbl. daily below the August figure.

Runs in August averaged 565,492 bbl. daily, considerably higher than the allowable. Representatives of major crude-purchasing companies estimate the actual reduction in production from August will average somewhere between 35,000 and 50,000 bbl. daily. This was one of the sharpest allowable cuts in the state's history.

Nearly all major crude purchasers in the three states reported their storage situation as critical.

During the Oklahoma hearing, J. M. Linehan, president of Mid-Continent Pipe Line Co., said his firm is buying oil at a rate 26.7 per cent above nominations. He said the company currently is buying 5,000 bbl. daily in excess of needs and that its excess stocks totaled 450,000 bbl. September 11, and 555,000 bbl. at the time of the hearing.

Several Oklahoma buyers last week had followed Magnolia Petroleum Co.'s lead in reducing its purchases and its own production. The latest was Sunray Oil Corp., which cut back purchases and production by 25 per cent effective October 5. P. M. Broach, Sunray manager of crude-oil purchases said this about the reduction:

"Sunray, for many months, has expressed concern with the excess of crude stocks caused in part by state allowables being in excess of purchaser nominations. We do not have a market for all of the oil purchased in Oklahoma under existing allowables."

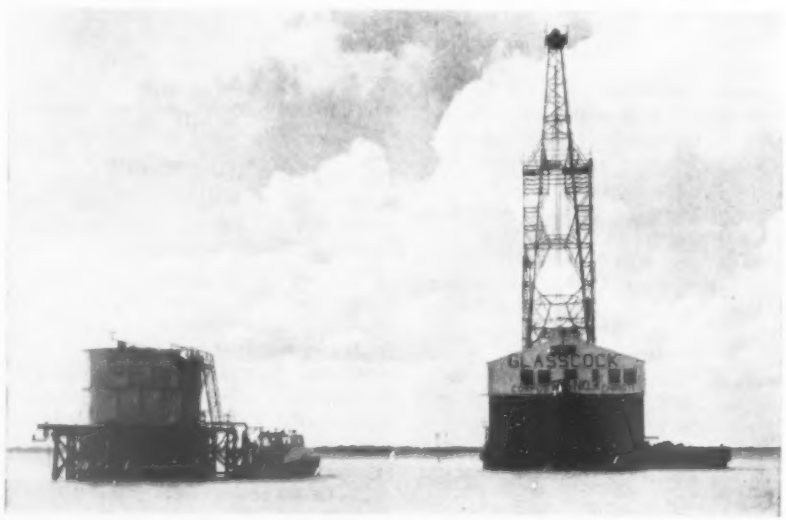
Other action . . . In other moves over the country:

. . . **Phillips Petroleum Co.** said it will cut refinery runs a further 3 per cent for October. The company reduced runs a similar amount in September. Phillips' total reduction is 16,000 bbl. daily.

. . . **Sinclair Refining Co.** revealed it will maintain this month its 5 per cent or 20,000 bbl. a day slash in runs.

. . . **Gulf Oil Corp.** said it expected to continue runs in its refineries at the same rate at which they were operating in September. Gulf cut runs 25,000 bbl. daily in mid-July and has maintained that pace since.

. . . **Cities Service Refining Corp.** re-



Gulf Offshore Drilling Continues

Offshore drilling in the Corpus Christi area is continuing at a steady pace, though slightly below past peaks. Pictured is a Glasscock Drilling Co. rig drilling for Atlantic Refining Co. in the Mustang Island field. The company has four other barge rigs operating in the area, but none of them are in the disputed tidelands water.

duced crude runs at its refinery at Lake Charles, La., by 7 per cent or about 11,000 bbl. daily.

The first big drop in refinery runs came in the week ended September 19. Runs for that week averaged 6,992,000 bbl. daily, down 224,000 bbl. daily from the previous week and 165,000 bbl. daily under the average for the 6-week period ended September 12.

Another drop in runs was reported for the week ended September 26. The average for this week was 6,880,000 bbl. daily, representing a reduction of 112,000 bbl. daily from the previous week and a drop of 277,000 bbl. daily from the average for the 6-week period ended September 12. Compared with the 6-week period, the largest cut was in District 2, down 186,000 bbl. daily.

Free Gas Price Urged

I.N.G.A.A. told gas supplies will dwindle away if price at well head is not enough to spark further exploration

Henry D. Ralph

HOUSTON. — The price of natural gas to the producer must be free to seek its own economic and competitive level if consumers are to be assured of adequate supplies for the future, several speakers told the annual meeting of the Independent Natural Gas Association of America here September 28-29.

The meeting, largest in the association's history, was marked by the attendance of three members of the Federal Power Commission: Chairman Jerome K. Kuykendall, Nelson Lee Smith, and S. L. Digby. To give these commissioners and members of the FPC staff who accompanied them a first-hand look at producing operations, a group of oil companies took them on a 2-day flying inspection tour of gas fields and recycling operations in Gulf Coast area.

While little was said about it in the formal addresses, the subject uppermost in the minds of most of the association members, particularly the producers, was the impending threat that the Federal Power Commission may attempt to regulate the well-head prices of gas on the basis of public-utility rates. This matter is now before the Supreme Court of the United States and at present is out of the hands of the FPC.

The chief FPC problem concerning the transmission companies at the moment is getting faster action by the commission on the huge backlog of applications for higher rates to consumers. Transmission companies ask new rates to cover rising operating costs and the recent rapid rise in the field prices of natural gas in many places. On this problem they got a promise from Chairman Kuykendall that the commission will revise its procedures to cope with the matter.

Question of supply . . . The problem of future gas supplies was raised by a producer, L. F. McCollum, president of Continental Oil Co.

Pointing to the rapid growth in consumption and the predictions of future growth, McCollum posed the question: Is exploration between now and 1975 going to be active enough to meet a demand 2½ times that of 1952, or will users then have to be rationed by arbitrary government allocations?

The supply will not be enough if gas continues to be only a byproduct of the oil industry, he said.

McCollum declared that the gas industry has now reached maturity and must carry its share of exploratory costs if needed additions to gas reserves are to be found. He added, however, that unless the gas producer receives a price at the well head to compensate him for production and the risks involved, future gas discoveries will be few.

He pointed out that drilling costs are not the only ones to be considered in figuring production expenses. He referred to money spent for geophysical exploration, land costs, rentals, and dry-hole expenditures.

"The Federal Power Commission follows the practice of using the depreciated net investment in calculating the rates which would permit a company within its jurisdiction to earn a stated annual return. The extension of this principle to include producing properties of gas transmission lines has, for all intents and purposes, driven those companies completely out of the gas-producing end of the business.

"If similar regulations are extended to cover the entire exploratory and discovery end of the gas business, all of us will ultimately be forced out of gas production.

"In the absence of an adequate price to the producer, the consumers will be faced with a progressively dwindling supply and with increasing costs to the end that they will have no gas at all in the foreseeable future."

McCollum asked if it is not the duty of the FPC to assure the consumer an adequate gas supply as well as to act as a watchdog over the consumer's gas bill.

"The ultimate price to the consumer has to be competitive with other fuels, and that part of the price paid to the producer has to be adequate to promote vigorous exploration, discovery, and production," he declared.

Higher field prices . . . A similar argument was advanced by Ernest O. Thompson, chairman of the Railroad Commission of Texas, who also urged the transmission companies to continue the program of renegotiating contracts to establish higher field prices for gas. Thompson told the meeting:

"Let gas prices be self-sustaining. A free, fair, competitive price will get the gas discovered, produced, processed transported, and distributed.

"The well-head price should not be fixed by law, either state or federal. Attempts at price controls generally mean scarcity and high prices. The attempts at helping the consumer nearly always go off on governmental overmanagement and arbitrary dictation. The end result is scarcity and higher prices instead of plenty and fair prices under the almost immutable law of supply . . .

"The better the price for gas at the well head, the better the conservation practices will be. Price is the best conservation agent. Good conservation costs money. It is worth the cost.

"It is to the consumers' vital, long-term interest that the well-head price of gas be increased. The consumer's first concern about natural gas is an assured, long-time, dependable supply of gas for his use in the home. No owner wants to change from gas. He is more concerned with supply than price."

Thompson said that a fair estimate of the going price for gas reserves in Texas today is probably 12 to 15 cents per thousand cubic feet, and he intimated that this ought to rise by another 5 cents per thousand. Such an increase, he said, would amount to about 25 cents a month, or less than 1 cent a day, to the household consumer.

"The effect of the 5-cent well-head increase," Thompson said, "is to stimulate further search for gas deposits and more drilling to develop these gas discoveries. Such development must come from the sale of gas. There is no other way to get the funds for exploring for gas."

Faster FPC work . . . Chairman Kuykendall in his address made no refer-

ence to prices or production, but promised to speed up decisions on rate cases by increasing the commission's staff, simplifying procedures, and making wider use of the conference method. He asked cooperation from the pipeline companies in this program.

Speaking, he said, for the entire commission, the chairman declared that the FPC has no arbitrary ceiling or floor for setting the rate of return which a gas company may earn on its investment, but while it tries to be consistent it will fix the return on the basis of its best judgment of the facts in each case.

"We believe that adequate regulation of your industry can be given by temperate and considered, yet firm and decisive, action on our part, and that harassment and intimidation are not necessary or proper tools of a regulatory agency," he said.

Educate the public . . . The persistent and vigorous effort to regulate the production of gas to the obvious discouragement of exploration must be combated by a program of educating the public as to the true nature of the gas business, James F. Oates, Jr., chairman of Peoples Gas Light & Coke Co., declared.

He urged sellers and purchasers in the gas industry not to make a public display of hostility over their different economic interests lest this undermine public confidence in the entire industry.

Edward T. McCormick, president of American Stock Exchange, told the meeting that all businessmen must assist the Washington administration in attempting to reverse the trend of recent years toward excessive taxation and regulation of industry if they expect to have conditions under which their businesses can prosper and grow.

Association report . . . In his report as president of the I. N. G. A. A., C. P. Rather, president of Southern Natural Gas Co., explained the new statistical-research and public-information programs of the association.

"The association and its individual members have taken advantage of every opportunity to express the view that the producer of natural gas can do a better job and provide more adequate gas supplies if it can continue its business without fear of regulation as a public utility," Rather said.

"We are convinced that the principal interest of the consumer is to have an adequate gas supply and that the consumer is entitled to be informed as to those facts which determine whether there will or will not be an adequate gas supply."

Educational Program

Oil Progress Week will be used this year to stress to the public oil's conservation efforts and their significance

OIL conservation and its significance to the American public is the theme to be stressed throughout the nation during the sixth annual Oil Progress Week October 11-17.

The Oil Industry Information Committee, sponsor of the annual celebration, hopes to achieve its goal of greater public understanding of the oil industry by emphasizing through a nation-wide campaign the continued effort and progress being made by it.

The week's activities will include open-house tours of oil facilities, speeches by oil men before civic clubs and other organizations. Poster displays and distribution by gasoline station operators also will stress industry efforts to obtain maximum benefit from petroleum resources and the steps being taken to preserve them for future generations.

"The sole objective of Oil Progress Week is public understanding," according to Stanton K. Smith, 1953 chairman. "By inviting public attention to the oil industry, by literally turning ourselves inside out, we hope to give the people a clearer picture of what free men and free competition are contributing to social and economic progress."

A new motion picture, "American Frontier," has been released for showing during the week-long celebration. It dramatizes the development of the Williston basin in North Dakota into an important oil-producing area.

First major event scheduled is a speech by Gov. Edward F. Arn of Kansas before a luncheon in Tulsa October 8. Governor Arn, chairman of the Interstate Oil Compact Commission, will speak on "Oil Conserves for You," which is the theme of Oil Progress Week.

Among the leaders expected to attend the Tulsa affair besides oil men from throughout eastern Oklahoma are Gov. Johnston Murray of Oklahoma; Earl Foster, executive secretary of the Compact Commission; and T. A. Morgan of Wichita, Kans., director of the conservation division of the Kansas State Corporation Commission.

About 1,400 are expected to attend a luncheon in New York City October 13 at which the contribution of the oil industry to the city's progress and prosperity will be brought up. B. Brewster Jennings, president of Socony-Vacuum Oil Co., Inc., and board member of the American Petroleum Institute, will be the principal speaker.

Mineral Rights in Doubt

OKLAHOMA CITY.—A ruling by the Oklahoma Supreme Court may prevent railroads in the state from claiming mineral rights on their right-of-ways.

The court recently ruled that the Missouri - Kansas - Texas Railroad does not own mineral rights under a strip of track in northeastern Oklahoma County. It's title, granted about 50 years ago, was only an easement and did not include mineral rights. As a result owners are entitled to royalties and lease money that has accumulated.

Acora M. and William H. Miley and others brought the suit and will receive an estimated $20,000. Lawyers say the ruling may govern a number of other similar cases.

Pilot Sells Half of Stock

TULSA. — One-half of the capital stock of Pilot Oil & Gas Co., has been sold to Simpson Fell Oil Co., Ardmore, Okla., for approximately $250,000.

The sale, according to Pilot President H. M. McMillan, is a step toward liquidation of the company which has been in operation since 1925.

H. B. Fell, president of Simpson Fell and executive vice president of the Independent Petroleum Association of America, made the purchase.

East Texas Posting Cut

HOUSTON.—Central Pipe Line Co., Ashland, Ky., last week cut its posted price for East Texas crude from $3.00 to $2.95 a barrel. The reduction still left Central, a subsidiary of Ashland Oil & Refining Co., paying 5 cents a barrel more than posted prices of major buyers in the area.

Central said the cut was made, not because of a fear of a crude-price break, but to put its East Texas purchases on a competitive basis with crudes in other areas where it purchases. Ashland trades all its East Texas crude for crude from other areas. Only one other company is known to be paying a price in East Texas higher than the general postings.

Huge Line Opposed

NPC members voice opposition to defense plans for pipe line from Gulf to East Coast; thorough study advocated

WASHINGTON.—A general resistance on the part of the oil industry to the idea of building a Gulf-East Coast "defense" pipe line in anticipation of war was evidenced last week at the fall meeting of the National Petroleum Council.

Although presented in a purely informal manner, with no request for an NPC study, the project was sharply criticised by a number of council members who declared that a further and very thorough study should be made before any decision is reached.

While representatives of the Armed Services listened in disagreement, oil men declared there is a great question whether the pattern of defense for the next war will follow that of World War II.

Refineries will be prime targets in the next conflict, they said, rather than tankers, and the crisis will be in production not transportation.

Presenting the subject for discussion because, he said, of the publicity given it, Deputy Petroleum Administrator Joseph A. LaFortune emphasized that no company or companies had any influence in directing government attention to the pipe line and it was purely a development of defense planners.

There was some thought on the part of council members that the pipe line, if built, might be a disturbing factor in the health of the oil industry in that it would provide an excess of transportation.

PAD view . . . LaFortune told the council that the proposal is that "somehow, sometime" the nation might develop new pipe-line capacity to deliver 540,000 bbl. a day of crude from Texas to the East Coast, 400,000 bbl. a day from the Middle West to the East Coast.

Previous discussions had developed that the idea contemplated the possible conversion of the line to products if necessary in the event of war.

"We know that the line about which we are talking is not . . . an attractive proposition commercially," LaFortune admitted. "What we are talking about —because we have a defense responsibility—is something that might be profitable at the moment but certainly would be needed in case of war. There will, we recognize, have to be some special incentive for construction."

PAD, LaFortune told the council members, has no intention of mapping out a route, saying what size pipe should be laid, or specifying the number of pumping stations to be built.

"This is not, after all, our problem in the last analysis," he declared. "We are supposed to be advisers on the problems of petroleum. We are not the people who make the controlling decisions."

Sub problem . . . LaFortune made it clear he does not agree with the "civilian strategists" who appear to believe the Russian submarine fleet, reportedly the largest in the world, would not attack our shipping in the event of war.

"You don't have to be a genius to recognize that the country can't count on all the present tanker capacity if we have a war," he said. "Too many of the tankers in off-shore operations are sitting ducks for an enemy submarine. Too many are needed for extraordinary shipments of crude or products just as soon as there is a theatre of war."

Submarine Line for Tanker Loading Laid

The size of today's tanker prompted Tide Water Associated Oil Co. to lay a 4,300-ft. submarine loading line offshore from Ventura to a new five-buoy anchorage in 43 ft. of water, deep enough to accommodate the largest of modern tankers. The 18-in. pipe was brought to the line site in 40-ft. lengths and then welded into six sections about 725 ft. in length. The ½-in. thick pipe was mill coated with an inch of Somastic coating and then more than half was given an added 1½-in. gunite coating. A 725-ft. section of track was laid to the ocean edge and each section lifted onto heavy timber skids equipped with steel shoes by eight 10-ton mobile cranes. After each section was pulled into the Pacific, another was lifted onto the track and welded to the line already in place. The pulling was done by a Smith-Rice Barge and onshore work was done by Macco Corp.

Refineries Surveyed

Foreign lube-oil output to average 53,100 bbl. daily

WASHINGTON.—Production of lubricating oils by refineries outside the United States and the Communist countries will average 53,100 bbl. per day next year as compared with 33,200 bbl. daily in 1952, it was forecast last week by the Petroleum Administration for Denfense.

Reporting on its recent survey on planned refinery expansion abroad, PAD found that foreign lube output next year will be nearly 60 per cent above that of 1952.

Figures were gathered on production rather than capacity since it is believed the former gives a clearer picture of probable free-world developments. A less-detailed survey in 1952 indicated that refiners abroad planned

a lube-oil capacity of 75,000 bbl. daily by 1955, but that capacity would be used only to the extent dictated by demands and economics.

Survey results . . . The study showed that lubricating oil capacity, per calendar day, would be increased in the Western Hemisphere from 11,400 bbl. last year to 17,700 bbl. in 1954, in Europe from 18,200 to 30,000 bbl., and in the Far East from 3,600 to 5,400 bbl.

Details of the PAD estimates by countries are shown in the accompanying table:

	Actual 1952	Expected 1954
Canada and Mexico	5,300	8,000
Caribbean and Venezuela and Colombia	5,300	8,600
Balance Western Hemisphere	800	1,100
Total Western Hemisphere	11,400	17,700
Free Europe	18,200	†30,000
Africa, Middle and Near East		
India, Australia, and Far East	3,600	‡5,400
Total Eastern Hemisphere	21,800	35,400
Total Free Foreign World	33,200	53,100

†UK, 42 per cent; France, 27 per cent; Germany, 15 per cent; Italy, 11 per cent.
‡Japan, 80 per cent.

Shelf Rules Issued

Regulations allow swap of state for federal leases

WASHINGTON. — Regulations under which oil and gas operators in the outer Continental Shelf can transfer state leases for federal grants have been issued by the Interior Department.

Supervision of operations in the Shelf beyond state boundaries in the Gulf of Mexico will be centralized in the office of the Regional Oil and Gas Supervisor of the Geological Survey, Tulsa. The Bureau of Land Management here will make determinations respecting the compliance or non-compliance of leases, as in the case of the public lands.

Requirements . . . To secure the transfer of leases from states to the federal Government, operators must meet the requirements of section 6 of the Outer Continental Lands Act of August 7, 1953, showing, among other things, that the leases was granted prior to June 5, 1950, and that all of its terms have since been complied with.

Operators must also tender to the Bureau of Land Managament any money due on rentals, royalties, etc.,

WATCHING WASHINGTON

Bertram F. Linz

Labor Battle Lines Drawn

The Taft-Hartley Labor Relations Act may be amended by Congress next year as promised by the administration, but not in any unconditional surrender to organized labor.

This was implicit in the resignation last month of Martin F. Durkin as Secretary of Labor following what he intimated was the repudiation of an agreement with the White House on 19 amendments to the law. Since Durkin, himself the head of a big AFL union, had been satisfied with those proposals it was evident that on the whole they were well in line with labor ideas on the law.

On the other hand, observers in Washington see the administration's rejection of some of the proposals which Durkin said had been agreed to as due to a realization that the House of Representatives, which has always approved strong curbs on union activities, would not accept them.

The situation now is one of open warfare between labor and the administration which will make it difficult to get any sort of revision of the law through Congress next year. This first split in the administration organization will probably be made a political issue in next year's congressional campaigns and a lot of congressmen who will be seeking reelection would like to avoid it.

In view of the fact that Durkin demonstrated that a labor official could not go along with administration policies where they are out of line with those of labor—his being a Democrat had nothing to do with it—the probabilities are that his successor will be selected from some field removed from both industry and labor, possibly a lawyer or educator.

No "Replacement" Taxes?

Congressional leaders do not believe there will be much in the way of new taxes levied next year to make up the revenues lost by scheduled reductions, but there is a possibility that some of the reductions on which the administration has not yet committed itself may be modified or deferred.

The administration has promised to wipe out the excess profits tax and the emergency increase of approximately 10 per cent in individual income taxes January 1. It has not made any promises regarding the five-point reduction in corporation income taxes or the elimination of the emergency increases in the levies on gasoline and other products scheduled for April 1.

It is figured the government will lose approximately $5,000,000,000 from the excess profits and individual tax repeals and another $3,000,000,000 from the April 1 reductions and possibly another $1,500,000,00 from the tax-revision measure now being studied.

The best bet for offsetting the loss would have been a sales tax, but Congress is not likely to consider it in an election year.

FTC to Try Enforcement

The Federal Trade Commission, probably for the first time in its existence, is attempting to see that its orders are obeyed.

Beyond the initial report of compliance that respondents are required to file within 6 days after the issuance of a cease-and-desist order, the commission has had no way of ascertaining whether they continue to meet its requirements.

The decision to seek better compliance followed the discovery recently that trade practice rules adopted some years ago for an important industry were not only not being observed but seemingly had been completely forgotten by everyone in the industry and apparently also by the commission itself.

The commission currently has outstanding about 180 sets of trade practice rules, 8,400 stipulations and 4,500 cease-and-desist orders applying to practically every segment of business.

But with respect to most of its orders, FTC officials admitted, they don't know with any degree of certainty whether the respondents have continued to be in substantial compliance.

Given no police authority by Congress, the commission is dependent upon the courts to require compliance with its orders or to punish businessmen for non-compliance. No machinery has ever been set up to follow through on orders and take action on those that are being ignored.

up to September 24, 1953. Payments falling due after that date must be made to the regional oil and gas supervisor in Tulsa.

All leases are to continue to be subject to any overriding royalty obligations existing on the effective date of the act. Also, operators must certify that their leases were not obtained by fraud or misrepresentation but in good faith upon a full disclosure of facts. Where applicable, the leaseholder's consent in writing to the increase in royalty, and his consent to reduction of the lease term so that it will not exceed the maximum specified in the law must also be submitted.

Storage Needed for Avgas

WASHINGTON.—Some 20 refiners of aviation gasoline for the military are being asked by the Armed Services Petroleum Purchasing Agency to report whether they can store avgas which cannot be picked up this year until it is needed during the first half of 1954.

All military requirements of Grade 100/130 and Grade 115/145 for the current half-year have been met, due partly to rescheduling of purchases so that less product was procured than will be required in the first 6 months next year. The rescheduling was due to a lag in the construction of military storage facilities, due to the tight steel plate supply situation. Because of this the military found it impossible to lift approximately 3,200,000 bbl.

The refiners have been asked to study their storage situation with a view either toward building their own inventories of aviation fuel or making tankage available to ASPPA under short-term service contracts.

Alabama Files Tidelands Suit

WASHINGTON. — Invalidation of the Submerged Lands Act restoring tidelands to the coastal states has been asked of the Supreme Court by the State of Alabama.

The suit aims at the same objective as the case filed previously in the District of Columbia federal court by Arkansas, which contends the offshore oil belongs to all the states rather than only to those on the coasts. The Alabama suit rests more heavily on the contention that under the act Alabama fishermen could be required to pay license fees to Texas, Florida, and Louisiana if they wanted to fish within those states' seaward boundaries.

The Alabama petition told the court the three states are ready to put such regulations into effect. Also, it claimed that they might attempt to exercise control over much greater areas than were given them under the act since Texas claims jurisdiction as far out as the edge of the Continental Shelf, and Louisiana claims that its boundaries should extend 27 miles into the Gulf of Mexico.

As did Arkansas, Alabama asked that the Government be restrained from transferring to the states any part of the fund accumulated in escrow while ownership of the tidelands was in controversy.

Research Advisors Named

WASHINGTON.—John G. Bartram of Stanolind Oil & Gas Co., Tulsa, and Paul D. Foote of Gulf Research & Development Co., Pittsburgh, have been named by the National Science Foundation as members of a permanent advisory panel on minerals research.

The panel will advise the foundation in developing policy on basic research in the field of mineral discovery and exploration. It will review and implement the recommendations made last year by the Paley Materials Policy Commission.

A large field of minerals research has been tentatively outlined for the foundation, which will hold its first general meeting here next winter. The studies on fundamental geologic and geochemical research relate principally to ores. However, in the field of geophysical research, studies have been suggested on the behavior and movements of fluids under high temperatures and pressures, and their movement in different kinds of rocks and openings.

In the field of applied research on methods of exploration, studies of better drilling methods were suggested.

San Juan Lease Bids Invited

WASHINGTON.—Bids for the sale of oil and gas leases on 1,814 acres of land in the known geologic structure of the San Juan field in San Juan and Rio Arriba counties near Farmington, N. Mex., are being invited by the Bureau of Land Management, to be opened October 14.

The land will be leased in 7 parcels, 6 of them ranging from 120 to 640 acres. The seventh parcel is 14.47 acres within the approved San Juan 30-6 Unit Area, and as the balance of the section is committed to the unit agreement the successful bidder for the land will be required to join the agreement prior to the issuance of a lease.

PAD Vacancies' Filled

WASHINGTON.—Vacancies in the foreign operations section of the Petroleum Administration for Defense were filled last week by Deputy Administrator Joseph A. LaFortune.

David H. West of Red Bank, N. J., director of the foreign supply and transportation division since February 1952, has been named assistant deputy administrator for foreign petroleum operations.

Franz von Schilling, Jr., on leave from the California-Texas Oil Co., Ltd., has been named director of the foreign supply and transportation division, of which he has been serving as assistant director.

Philip M. Dean of Larchmont, N. Y., on leave from the Standard Oil Co. (N. J.), has been appointed assistant director of the foreign refining division. Since September 1952 he has been a special assistant in the division.

Anti-Phillips Petition Filed

WASHINGTON.—Interests fighting the Federal Power Commission's finding that Phillips Petroleum Co. was not a natural-gas company have asked the Supreme Court to affirm a decision to the contrary by the District of Columbia Appeals Court by refusing to review the case.

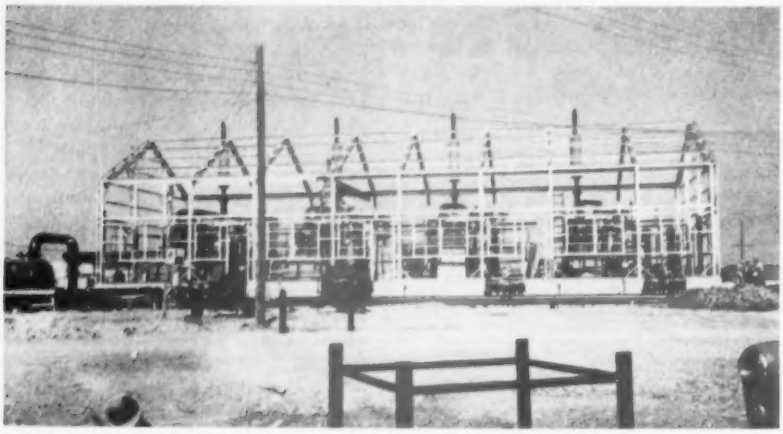
A petition to deny Phillips' request for certiorari was filed with the court by the State of Wisconsin and the cities of Detroit, Milwaukee, and Kansas City. The plaintiffs contend the lower court decision was proper and in full accord with the law and needs no review.

Phillips' petition has been supported by the State of Texas, but the Department of Justice has not announced whether it will join in the appeal on behalf of the FPC. It has until October 19 to make its position known to the court.

Michigan Lease Sale Set

WASHINGTON. — The Bureau of Land Management is inviting bids for the sale of an oil and gas lease on approximately 40 acres of acquired lands in the Manistee National Forest in Muskegon County, Michigan, to be opened October 28.

The land is in the known geologic structure of the Cedar Creek field, approximately 3 miles northwest of Sweeter, Mich. Sale of a smaller acreage had been planned for October 21, but was deferred because it developed that additional land in the same area is available for leasing.



NEW COMPRESSOR STATION of Sunray at Aransas Pass, Tex., went into operation last week before workmen had installed the roof and sides of the building. The station will allow Sunray to deliver up to 40,000,000 cu. ft. of gas daily from offshore gas-distillate wells to a metering station where it will be picked up by the transmission facilities of United Gas Co.

LTX UNITS like this offshore installation separate natural gas from distillate by low-temperature methods before the compressor station goes into action. There are five of these LTX units in Mustang Island and Redfish Bay fields. In this offshore installation, the LTX unit on the right is flanked by a boiler.

Gulf Gas Flows

New Sunray compressor station furnishes Mustang Island, Redfish Bay operators market outlet for gas production

William P. Sterne

CORPUS CHRISTI. — Sunray Oil Corp. last week solved the major problem facing operators in Mustang Island and Redfish Bay fields when it put its newest compressor station in operation and gave operators a way to get natural gas from offshore gas-distillate wells to land and to market.

The new compressor station, with those already in operation by Sunray and Renwar Oil Corp., will feed additional supplies of natural gas into a metering station near Ingleside, Tex. Here it is purchased by United Gas Pipe Line Co., and picked up through its new 36-mile, 16-in. feeder line to a connection with the main pipe-line system near Refugio, Tex. United spent about $2,700,000 in laying this line, which has a total capacity of 130,000,000 cu. ft. per day.

When all of the gas-gathering facilities for the high-pressure system are completed (Atlantic Refining Co. and Renwar are completing work on their portion of the project) gas production from all the gas-distillate wells producing from a 7,200-ft. sand (Common Zone 10) will be marketed. Operators have had to shut in as many as 30 wells in the two fields for want of an outlet—some of them for as long as 2½ years. Wells in both Mustang Island and Redfish Bay fields yield, on the average, about 20 to 25 bbl. of distillate per 1,000,000 cu. ft. of gas.

Operators pool acreage . . . Field operators, in forming Redfish Bay and Mustang system, pooled all their acreage from the two fields into five 640-acre drilling units to produce gas from Common Zone 10. Operators who have production in the area, in addition to Sunray, are Atlantic, Renwar, Stanolind Oil & Gas Co., Shell Oil Co., Tide Water Associated Oil Co., Heep Oil Corp., Sun Oil Co., and Arkansas Fuel Oil Co.

Most of the wells in the two fields are from 2 to 3 miles from shore, and well-head installations stand in about 12 ft. of water in Corpus Christi Bay.

Sunray holds two-thirds of the natural-gas reserves of the area. The company expects to deliver up to 40,000,000 cu. ft. of gas daily to United.

LTX units . . . Five LTX (low-temperature extraction) units have been installed within the fields' limits for separating the natural gas and distillate. Some are on offshore platforms. Sunray operates four units and Renwar the other.

The LTX units have more than 100,000 ft. of pipe connections. Sunray estimates the installation of its four units, complete with piping, has cost about $875,000. Petroleum Construction Co. of Corpus Christi had contract for laying of the combination 6 and 8-in. pipe lines from the LTX units to the metering station, and a 3-in. distillate line to storage on shore.

Other facilities . . . In addition to the LTX units and gathering lines, overall equipment includes six 1,000-bbl. distillate-storage tanks, preliminary distillate stabilizers, a scrubber, and a distillate-storage tank which is on United Gas property.

There are three gas-distillate producing zones in Mustang Island and Redfish Bay fields, but the gas taken under the pooled arrangement is from the one zone, Common Zone 10. Operators handle their own individual distillate production from the other zones.

WRECKING OPERATIONS under way in this old portion of the Elwood field shortly will remove all traces of piers which marked the offshore area. The pier remnants in the foreground once contained wells of Honolulu Oil Corp. Two of the piers in the background also are being demolished.

Elwood Near Exhaustion

Offshore piers are being razed as one of California's more famous oil fields sees most of its wells abandoned

D. H. Stormont

LOS ANGELES.—One of California's more famous oil fields, Elwood, on the Pacific Coast 10 miles west of Santa Barbara, is nearing exhaustion.

An extension area developed in the past decade will keep the name alive for years to come but the older portion is about depleted. By year's end about half of the piers which once marked the offshore portion of the field will have been demolished.

Of the field's current output of 4,100 bbl. daily, about 3,100 bbl. is coming from a separate pool approximately ½ mile west of the old area. This portion was developed by Signal Oil & Gas Co. since 1943. The production was tapped by 30 slant holes drilled from upland sites. In the offshore portion of the old field piers were employed.

Only 40 wells are still producing of the 94 originally completed in the 400-acre discovery area, developed between 1928 and 1937, and some of these are slated for early abandonment. The portion which produced almost 50,000 bbl. daily at its peak, and has a cumulative production of approximately 75,000,000 bbl. of oil, today has an output of about 1,000 bbl.

Early completions in the discovery area commonly flowed 2,500 bbl. of clean oil daily. Largest initial production recorded was 14,500 bbl. daily, by Barnsdall Oil Co.-Richfield Oil Corp. 6 Luton-Bell. Ultimate recovery of this now abandoned well was 2,500,000 bbl.

Claim to fame . . . The field's chief claim to fame lies in the fact that prior to Elwood's discovery the 320-ft. thick Vaqueros sand had not produced commercial quantities of oil. Conditions for it containing oil at Elwood were theoretically unfavorable: the 3,200-ft. deep pay is directly underlain by some 5,000 ft. of nonmarine Sespe and inorganic sandstone, and overlain by more than 1,000 ft. of Temblor claystone—all apparently too lean in organic matter to serve as good source beds.

Discovery of Vaqueros production in Elwood thus gave geologists a new objective. It started the search for other fields in the immediate region and in other California areas where lower Miocene formations might be found.

Sunray Oil Corp., whose forerunner Barnsdall Oil Co. was the field's discoverer, is demolishing an 1,800-ft. pier which once contained six producers. A shorter one from which eight wells were drilled will meet the same fate. Of the 28 wells drilled on the company's upland leases only 9 remain today, producing about 160 bbl. daily.

Honolulu Oil Corp. has abandoned all its offshore producers. The four piers from which eight wells were drilled are likewise nearly demolished. Signal plans to abandon some of the eight wells on the three piers it took from Bankline Oil Co.

The job of wrecking the piers is costing the two companies almost $500,000.

City Plans Survey

Seismic survey of offshore Long Beach land scheduled

LONG BEACH.—The city of Long Beach expects to start a seismic survey of its offshore oil properties some time this winter.

Money from the Tidelands Oil Fund can be used for the survey, City Manager S. E. Vickers told the city council recently. It will not be necessary to wait for the project to be voted on at a special election proposed for late this year, he said.

While the Wilmington field is expected to be productive from the Long Beach Harbor area 4½ miles to the extended southeastern city limits, no geophysical work has been done except an aerial magnetometer survey. Preliminary estimates of offshore oil reserves recoverable by primary methods are 68,000,000 bbl. of oil.

In addition to the seismic survey, the city plans drilling two core holes along the eastern beach. These will help determine whether or not present concepts of the southeast trending anticlinal structure are correct or not.

Since about 500 acres of the undeveloped reserves underlie Long Beach, plans are being made to develop this area in conjunction with the offshore portion. This involves unitization of the privately owned properties with the city's submerged lands.

Unitization will involve amendment of the state law, I. M. Smith, city attorney, said. The terms under which the state ceded title to the city in 1911 do not permit such an arrangement. Proposed change in the city charter to permit unitization, and uniting producing city properties in the harbor area with those of oil companies for purposes of pressure maintenance, will be voted on in the special election.

Pool Output Doubled

Infill drilling, improved recompletion practices increase production of Long Beach's earthquake-damaged wells

D. H. Stormont

LOS ANGELES.—Infill drilling and better recompleting practices on earthquake-damaged wells resulted in a Wilmington pool doubling its output after it had apparently passed its production peak.

As reported by G. R. August and S. N. Davidson, Long Beach Harbor Department engineers, at the annual A.I.M.E. Pacific Petroleum Chapter here October 1, the upper Terminal pool in fault-block III was considered developed in April 1942.

By then 30 wells had been completed in the 3,400 to 3,900-ft., 294-acre pool. Daily output was about 5,000 bbl. and it remained at that level until mid-1945. Production was down to about 2,500 bbl. daily when an earthquake struck in November 1949.

Earth movement at the 1,600-ft. level severely damaged several of the wells. In some cases it was not possible to pull the rods and tubing to cement opposite the perforations to obtain proper abandonment. Seven of the eight wells operated by the City of Long Beach were offset so badly they could not be operated, the authors reported.

Reconditioning results . . . When redevelopment was started, the superior performance of the recompletions, coupled with a prior intent to do further north-flank development, led to replacement drilling and five-spotting over the entire reservoir. The result was that the pool's output, from 51 wells, climbed to almost 12,000 bbl. daily in late 1950 and is still hovering near that level.

The eight wells owned by the city of Long Beach were producing an average of 850 bbl. daily just prior to the quake. By recompleting six wells and drilling one additional well, output was boosted to 4,850 bbl. daily in May 1950.

The city property is developed to approximately 4-acre spacing. The recompletions were made within 300 ft. of the earlier well point, but wherever possible kept 30 ft. or more away from the abandoned well in order to avoid any contaminated zone.

As brought out by August and Davidson, "the recompletions were into depleted areas since the pressures fit very closely the established pressure-decline curves.

"The improved well performance seems to be related solely to the great increase in productivity resulting from improved bore-hole conditions. These observations bring out the low completion effectiveness of the original completions."

Methods . . . Practices used by the city's contractor, Long Beach Oil Development Co., in the original development, were described by the authors as being representative for the south part of the pool. Nearly all were multiple completions, including either the Ranger or lower Terminal in addition to the upper Terminal.

To separate the oil zones, at least 100 ft. of blank casing equipped with cementing collars was included between each zone. To get a proper seal between zones it was necessary occasionally to recement as many as four times, with the result "it frequently was found that cement was strung inside the oil string along much of the perforated interval."

While scratchers later were run to remove any cement which may have lodged in the perforations, total time between drilling out after the water shutoff test and completion of the well varied between 15 and 35 days. All drilling and cementing operations were carried out with a fresh water, clay-base mud weighing 80 to 85 lb. per cu. ft. Placing a well on production the mud was circulated out by water, and the water then followed by oil.

In the redevelopment work only single-zone wells were drilled, and the total time in the hole from water shutoff to placing the well on production varied from 3 to 6 days. In place of a water-clay mud, oil-base was used in drilling through the oil zone. Another different practice employed in completing the redrilled wells was to clean the hole by reciprocating the scratcher-equipped liner, after the oil-base mud had been replaced with crude oil.

FIRST ALL-ELECTRIC RIG on the West Coast is in operation in the Ventura Avenue field.

Electric Rig Drilling

AC-DC variable voltage rig is in Ventura Avenue field

VENTURA.—An all-electric a.c.-d.c. variable voltage rig, the first ever used on the West Coast, has been placed in operation by Tide Water Associated Oil Co. in Ventura Avenue field.

Alternating current, supplied at a line voltage of 16,500 and transformed to 2,300 volts, powers four 380-hp. motor-generator sets. Output of the 250-kw. variable voltage generators, which operate at 1,200 r.p.m., is 395-volt direct current. Two of the generator sets are equipped with gas engines in case of power failure.

The draw works is powered by an 800-hp., 600-r.p.m. motor. The two main mud pumps are driven by 500-hp. motors and a third has a 100-hp. motor. All are forced-air ventilated by means

of air ducts connected to a blower fan.

The rig is designed to reduce the dead time in making round trips. The d.c. motor speed is governed by a rheostat to control generator excitation, permitting the driller to adjust his motor speed easily in the event of any hole difficulties. The driller knows exactly the amount of power applied, and the variable gear ratio permits pulling heavier loads at lower speeds.

Three main power buses and three master controllers permit carrying on three operations simultaneously with independent control of each. For example, by pumping at full power with one pump and rotating the table, mud may be mixed with the other pump.

Rehearing on Permits Set

SANTA BARBARA, Calif. — The State Fish and Game Commission has agreed to hold a rehearing on permits it granted three oil companies recently for seismic exploration offshore here.

The county supervisors asked for the rehearing after Dist. Atty. Vern Thomas told them that the commission and the State Lands Commission did not have the power to issue seismic-oil permits. Also, Thomas asserted that kelp beds offshore would be damaged by blasting operations.

The Fish and Game Commission plans to hold the rehearing after its October 22 meeting.

ECONOMICS

High-Demand Forecast

Winger sees gain of 6.3 per cent this year, 4.3 in 1954; business dip, largely offset by other factors, anticipated

NEW ORLEANS.—Total demand for crude and products in 1954 is expected to be 4.3 per cent greater than this year, according to a forecast presented here at the annual meeting of the Louisiana-Arkansas division of the Mid-Continent Oil and Gas Association by John G. Winger, petroleum economist for the Chase National Bank.

Winger estimated the 1953 increase at 6.3 per cent over 1952, which would put the daily average for this year at about 8,200,000 bbl. daily. An increase of 4.3 per cent over this average for 1953 would indicate a forecast of about 8,550,000 bbl. daily for 1954.

Exports of crude and refined products are expected to decline next year, resulting in gains in domestic demand somewhat larger than the increases in total demand, Winger said.

Recession allowance . . . In the forecast, some allowance was made by Winger for a lower level of business in 1954. As a measure of the slight decline in business next year, he estimated that the average of the Federal Reserve Board's Index of Industrial Production for 1954 will be about 220 compared with a current figure of 238 and an estimated average for this year of 237.

Winger listed several reasons to support a prediction of some decline in the business level for 1954.

Downturn indicators include:

. . . Lower expenditures by the federal Government for defense and other purposes.

. . . Slackening demand for consumer durable goods.

. . . Large inventories in some consumer-goods lines.

. . . Lower prices for agricultural products without a corresponding drop in the general price level.

These favorable factors are expected to prevent any serious drop:

. . . The continuing rapid growth in population, a gain of 4.5 million in the 2 years ended July 1, 1952.

. . . High rate of personal savings despite near-record consumer expenditures.

. . . Recent consumer spending has been normal with no scare buying.

. . . Income shrinkage from reduced overtime may be offset by tax reductions in 1954.

. . . Recession has been expected for so long that many segments of the economy have gone through a period of adjustment.

. . . A backlog of needed road building and other public construction was built up during the Korean war.

Winger estimated that petroleum supply for next year will need to increase only 3.6 per cent over 1953 since some of the production and imports this year went for increases in stocks.

Refinery runs are forecast at about 7,400,000 bbl. daily for 1954 for an increase of 4.2 per cent over 1953.

Beyond 1954, Winger expects demand to resume its normal growth pattern, reaching an average of 10,400,000 bbl. daily in 1958.

Imports, Exports Dip

July imports were below 1,000,000 bbl. per day

BOTH imports and exports decreased in July, according to data released by the Census Bureau of the Department of Commerce.

Total imports into continental United States averaged 935,000 bbl. daily for July compared with 1,062,000 in June and the all-time record of 1,212,000 bbl. daily set last December.

Crude imports dropped 101,000 bbl. daily in July with most of the cut in receipts from the Middle East. Total crude from the Midde East averaged 205,000 bbl. daily compared with 283,000 bbl. daily in June.

Product imports decreased 26,000 bbl. daily in July with most of the loss in residual fuel.

Exports of crude and products, excluding shipments to territories, averaged 312,000 bbl. daily in July, the lowest level reached since March 1951. Most of the decrease of 56,000 bbl. daily from June was due to relatively large reductions for crude, kerosine, and distillate fuels. Gasoline exports averaged 87,800 bbl. daily for an increase of 20,800 bbl. daily over June.

IMPORTS INTO CONTINENTAL UNITED STATES

(Thousands of barrels)

	July 1953	June 1953	July 1952
Crude—			
Mexico	381	593	402
Colombia	1,340	1,260	1,407
Venezuela	9,277	9,408	10,694
Kuwait	3,695	4,147	2,832
Saudi Arabia	2,490	4,219	2,138
Qatar	172	114	
Canada	158	224	3
Far East	1,662	1,594	354
Total crude	19,175	21,559	17,830
Daily average	618	719	575
Products—			
Residual fuel	8,930	9,543	7,997
Other products	888	755	1,112
Total products	9,818	10,298	9,109
Daily average	317	343	294
Total all oils	28,993	31,857	26,939
Daily average	935	1,062	869

EXPORTS*

	July 1953	June 1953	July 1952
Crude	1,232	1,824	1,876
Gasoline	2,715	2,004	2,715
Kerosine	403	904	795
Distillate fuel	2,118	2,711	2,963
Residual fuel	1,398	1,645	2,472
Lube oils	1,105	1,038	1,312
Other products	716	918	820
Total all oils	9,687	11,044	12,953
Daily average	312	368	418

*Excludes shipments to territories.

CANADA

Big Program Begun

Petrofina discloses plans for big integrated company

MONTREAL, Que.—Long-term plans for entering Canada with producing, manufacturing, and marketing operations, were confirmed last week by the major Belgian oil company, Cie. Financiere Belge des Petroles, known as Petrofina.

Through its new subsidiary, Canadian Petrofina, Ltd., the company will build a 20,000-bbl. per day refinery here to operate on imported crude.

The new $20,000,000 refinery will incorporate a two-stage crude unit, thermal visbreaking, catalytic cracking, catalytic polymerization, catalytic reforming, and catalytic desulfurization. Construction contracts are expected to be let shortly, and initial operation of the new plant is scheduled for late 1955. Arabian, Kuwait, South American, and other crudes will be processed, and the plant will be designed to convert sour crudes to high-octane gasolines and low-sulfur fuels.

Future plans . . . Canadian Petrofina is already in the marketing business, having opened its first service station in this area last week. "Fina" and "Super-Fina" gasoline will be obtained from other sources until the new refinery is on stream. Meanwhile, the company plans to expand its distribution system to leased and independent stations throughout Quebec and in Ontario, east of Toronto. Terminal storage facilities have been leased in this area. Initial capital of $25,000,000 has been raised for refining and marketing operations.

From the production standpoint, a sister affiliate, Canadian Fina Oils, Ltd., has been active in exploration and drilling in western Canada for over 3 years and is stepping up activity. Eventually, the parent company plans a wholly integrated Canadian subsidiary.

L. B. Wolters of Brussels, managing director of the parent company, is president of the new Canadian subsidiary. A. F. Campo, executive vice president and managing director, will spark the Canadian operations. He comes from McColl-Frontenac Oil Co., Ltd., where he was sales manager until earlier this year. Another McColl-Frontenac man, J. A. Alexander, will head manufacturing as general manager of refining. He was formerly assistant superintendent of McColl's Montreal refinery. General manager of marketing is G. B. Longhurst, and E. Laurent is vice president of the Canadian company.

Pass Delays Finish of Line

VANCOUVER. — Construction difficulties in the rough terrain of Coquihalla Pass last week delayed the final linking job on Trans Mountain Oil Pipeline Co.'s 711-mile crude line from Edmonton to Vancouver.

H. H. Anderson, president of Trans Mountain, said testing work on the line was moving ahead and deliveries of crude at Vancouver are expected by October 10. Formal ceremonies dedicating the new line have been scheduled for October 15 in Vancouver.

ROCKY MOUNTAIN

Williston Refinery Started

WILLISTON, N. D.—A new 1,500-bbl. per day refinery is now under construction east of here by Williston Basin Refinery Corp. Designed for eventual expansion to 5,000 bbl. per day, the new plant will incorporate the conventional processing units plus a catforming unit to be licensed by Atlantic Refining Co., according to the firm's president, Robert F. Mowdy.

Grading and foundation work has been completed, and some storage has been installed. Construction began August 14 and is scheduled for completion by January 1. Koch Engineering Co., Inc., Wichita, Kans., has contracted to do the design, engineering, and construction work.

Initially Williston basin crude will be moved to the plant by tank car.

Second Crossing Scheduled

MANDAN, N. D. — Service Pipe Line Co. this week is scheduled to make the second of two river crossings on its 154-mile, 12 and 16-in. crude line from the Tioga-Beaver Lodge area to Mandan, N. D.

About 3,800 ft. of 16-in. pipe will be pulled across the Little Missouri River in Dunn County. The other crossing, more than 2 miles of 12-in. across the Missouri River channel and the bed of a lake to be created by water backing up from dam now under construction at Garrison, N. D., already has been completed.

With the exception of some work at the Mandan end of the line, work on the overland portion of the project has been suspended temporarily pending arrival of more pipe.

The entire operation also has been slowed to some extent due to adverse weather conditions. The tentative date for completion of the project now has been set for the first of the year.

Contractor on the project is O. R. Burden Construction Corp. The line will serve a new 30,000-bbl. refinery at Mandan now under construction by Standard Oil Co. (Ind.), Service' parent firm.

SOUTHWEST

Awards Announced

Carter, Baker to receive association service honors

DALLAS.—Two champions of oil and gas conservation, Amon G. Carter, Fort Worth publisher and independent oil producer, and Hines H. Baker, Houston, president of Humble Oil & Refining Co., will receive the Texas Mid-Continent Oil and Gas Association's 1953 distinguished service awards this week.

The awards, presented annually by the association to an independent operator and a major company representative, will be made at Houston during the association's thirty-fourth annual meeting this week.

HINES BAKER

AMON CARTER

Carter, long active in the oil business, supported the first proration move in Texas and was one of the leaders in West Texas' fight to obtain proration recognition.

President of Humble since 1948, Baker is a legal scholar and the author of several papers on conservation, depletion allowance, and the tidelands question that are regarded as authorities.

Forest Seeks Flood Permit

AUSTIN.—Forest Oil Corp. is seeking Texas Railroad Commission permission to water flood the 350-ft. Lower Tannehill sand underlying 16 leases in Callahan County Regular field.

The company asked that the field be exempt from shutdowns, with injection and producing wells assigned allowables on a lease basis.

Crude Output Down

U. S. decline drops Free World production in July below record 12,044,700 bbl. per day chalked up during June

Dahl M. Duff

CRUDE-OIL production from fields through the Free World dropped back in July for the first time in 4 months.

The decline, however, was an almost negligible 9,500 bbl. daily and left the July average only slightly below the record-breaking 12,044,700 bbl. daily achieved in June.

Crude output decreased in the United States, Venezuela, and Kuwait. Gains were reported in Canada and Saudi Arabia. United States production was off nearly 25,000 bbl. daily to 6,570,000 bbl. daily.

The net change in foreign production from June to July was an increase of about 15,000 bbl. daily, but this was offset by the decline in the United States. The relatively small gain in foreign production was, however, sufficient to establish another new monthly record in total crude output abroad.

Foreign production this year increased each month after January. The sharp gains made in the Middle East more than made up for the depressed level of production in Venezuela. In July, total Middle East production declined slightly, but Canadian production moved considerably higher and during the month showed the largest increase of any of the world's producing countries.

Foreign share gaining . . . The Free World daily average output in July of 12,035,200 bbl. daily compares to an average for the first 7 months of 11,802,200 bbl. daily. Non-Communist foreign production during July averaged 5,465,200 bbl. daily. This compares to an average production the first 7 months of the year of 5,281,000 bbl. daily.

The continued gains in foreign crude production over the last several years have diminished the relative importance of the United States as the dominant oil producing country. The United States now produces slightly less than half of the world total, including Russia and other Communist countries. In the 1930's, by comparison, United States output made up 60 to 62 per cent of the total.

United States production has narrowed over the past few years to about 54.6 per cent of the world total, if the Communist areas are excluded.

Middle East drop predicted . . . Middle East oil production showed a slight decrease in July and some economists in the industry believe that it will fall further later in the year. The Middle East accounts for 85 per cent of the total non-Communist production of the Eastern Hemisphere, and the bulk of the production flows into Europe. Stocks levels in Europe are reported to be extremely high, a condition foreshadowing production declines.

The decrease in total Middle East production in July was despite a gain in Saudi Arabia. Arabian American Oil Co.'s output of 909,677 bbl. daily set a new record not only for the company but also for the Middle East. This producttion represented a slight increase over the previous Middle East high, Kuwait Oil Co., Ltd.'s., 906,500 bbl. daily in June.

Kuwait's July production dropped back 37,000 bbl. daily in July. Pro-

TREND OVER THE LAST YEAR

1952—	W. hemisphere less U. S.	Middle East	Total non-Communist foreign
August	2,425.5	2,091.7	4,921.7
September	2,417.8	2,168.2	4,994.8
October	2,455.8	2,175.1	5,047.2
November	2,504.9	2,174.7	5,098.7
December	2,561.3	2,092.1	5,075.0
1953—			
January	2,472.8	2,252.3	5,152.2
February	2,407.2	2,258.4	5,096.8
March	2,412.5	2,266.1	5,104.8
April	2,448.1	2,426.8	5,306.6
May	2,423.1	2,523.7	5,391.0
June	2,459.4	2,536.0	5,450.1
July	2,484.3	2,530.9	5,465.2

CRUDE-OIL PRODUCTION
(Daily average in thousands of barrels)

Country—	July 1953	June 1953	July 1952
W. Hemisphere:			
Argentina	78.5	78.3	66.7
Bolivia	1.3	1.4	1.5
Brazil	2.6	2.5	2.1
Canada	256.0	224.0	188.5
Chile	3.0	3.0	2.4
Colombia	107.7	105.5	108.6
Cuba	0.1	0.1	0.1
Ecuador	8.2	8.2	7.8
Mexico	190.0	182.1	207.1
Peru	44.0	44.4	46.7
Trinidad	61.5	60.8	59.0
Venezuela	1,731.4	1,749.1	1,803.1
Total	2,484.3	2,459.4	2,493.6
Europe & Africa:			
Algeria	1.7	1.7	1.2
France	7.4	7.3	7.0
Fr. Morocco	2.1	2.1	1.9
W. Germany	43.2	42.4	34.8
Italy	2.0	1.9	1.6
Netherlands	16.1	15.8	14.0
Egypt	46.0	46.1	45.0
United Kingdom	1.1	1.1	1.1
Total	119.6	118.4	106.6
Middle East:			
Bahrein	30.1	30.1	30.0
Iran	35.0	38.6	31.0
Iraq	591.1	588.7	337.0
Kuwait	859.5	906.5	810.2
Qatar	95.1	90.8	68.1
Saudi Arabia	909.7	880.9	850.5
Turkey	0.4	0.4	0.3
Total	2,530.9	2,536.0	2,127.1
Other Asia:			
British Borneo	102.0	101.7	104.4
Burma	2.5	2.5	2.4
India	6.0	6.0	6.0
Indonesia	205.0	211.9	179.3
Japan	6.0	5.7	6.1
New Guinea	5.0	4.6	4.6
Pakistan	3.9	3.9	3.4
Total	330.4	336.3	306.2
Total non-Communist, foreign	5,465.2	5,450.1	5,033.5
United States	6,570.0	6,594.6	6,092.5
Total, free world	12,035.2	12,044.7	11,126.0
Est. Russia and E. Europe:			
Austria (Soviet Zone)	65.0	65.0	55.0
Romania	85.0	85.0	80.0
Russia	1,060.0	1,060.0	965.0
Other Communist	34.6	34.6	25.1
Total	1,244.6	1,244.6	1,125.1
World total	13,279.8	13,289.3	12,251.1

Figures are from reliable reports in the industry or official government sources. Data for Russia and Eastern Europe are based on competent estimates; no authentic information is available on month-to-month production in these areas. Estimates have been made for certain other countries, particularly in Southeast Asia, for which completely current reports are lacking. Other Communist includes China and Yugoslavia as well as the Soviet satellite countries in Europe.

duction from Iraq's fields was little changed. Kirkuk field was down slightly to 488,600 bbl. daily, while Zubair increased 5,100 bbl. daily to 63,900 bbl. daily. Production in Qatar rose to 95,100 bbl. daily, a new high for the shaikhdom. Last official figures for Iran are for June. During that month, the National Iranian Oil Co. produced an average of 72,800 bbl. daily and recycled 34,200 bbl. daily, leaving a net of 38,600 bbl. daily.

Germany . . . West Germany's crude production made another gain in July. Particularly noticeable was the rise in production in Hemmelte-West field in South Oldenburg which was discovered in 1951. The field had an output in July of about 2,340 bbl. daily.

Egyptian production continued to hold at about 46,000 bbl. daily but the existing Sinai fields are expected to go into a slow decline in a year or two.

Venezuela . . . Venezuelan crude production was down a further 17,700 bbl. daily in July, marking the lowest level since last February. Venezuelan production in July was nearly 72,000 bbl. daily, or about 4 per cent below the average for 1952. Production in Venezuela by weeks was: week ended July 6: 1,732,800 bbl. daily; July 13, 1,740,400 bbl. daily; July 20, 1,730,600 bbl. daily; and July 27, 1,732,900 bbl. daily.

The gain in Canadian output in July was 32,000 bbl. daily, or 14.3 per cent. As compared with July 1952, Canadian production was up 35.8 per cent.

Mexican production, on the other hand, continued in a slump attributed to lack of markets for the part of its output that is exported. The approximately 190,000 bbl. daily produced in Mexico during July compares to a 1952 daily average of nearly 215,000 bbl. daily.

MIDDLE EAST

Iranians Enlightened

Gloomy report on country's economy gives public the facts for first time since nationalization; changes are promised

FOR the first time since the oil industry was nationalized 2½ years ago, the Iranian public has been told the hard facts of the country's oil position by the government itself.

Prime Minister Zahedi in a statement in Teheran said that since the May 1951 nationalization, the oil business had run up a $28,700,000 debt, and that the prolonged shutdown had cost the nation at least $200,000,000 in revenue.

The statement, which was read over the Teheran radio and published in full by all of the capital's newspapers, was in sharp contrast to the optimistic and reassuring announcements which were frequently made during the regime of the ousted Prime Minister Mossadegh.

The government's statement was interpreted as laying the groundwork for renewed negotiations for a settlement of the dispute. The Iranian public, it is felt, is being prepared for the concessions which the government probably will have to make.

The Mossadegh government gave many Iranians an utterly unrealistic idea of the costs and effort involved in operating a large oil property.

The Iranian statement said that the present position of the National Iranian Oil Co. is "deplorable" and that the government hopes to take "necessary and effective measures to vindicate Iran's rights in a way compatible with the nationalization law and to compensate for the losses and damages the Iranian people have suffered."

What is needed . . . Between $30,000,000 and $40,000,000 in spare parts and equipment and the services of 600 technicians would be needed to bring the Abadan refinery back to its 500,000 bbl. daily capacity, the statement said. With 30 technicians and $6,000,000, operations could be resumed to produce about 180,000 bbl. daily of crude and refine between 80,000 and 100,000 bbl. daily, but this would mean throwing a large number of workers out of jobs.

The National Iranian Oil Co. has 56,263 persons on its payroll, only 5,000 fewer than Anglo-Iranian employed, and its debt is increasing at a rate of $1,250,000 a month. Most of the employes are now idle. The statement added that though the power plant at Abadan is in satisfactory condition, the date for the periodic examination of some of the turbines by representatives of the manufacturer is now past. Most of the power-plant equipment is British-made.

Settlement seen . . . The government action in making the gloomy report public added weight to predictions that negotiations over the oil question will start in the near future.

Industry reports are that Herbert Hoover, Jr., recently named special adviser to Secretary of State Dulles, will play an important part in the United States participation. One possibility is operation of the Iranian in-

Dresser Executive Tours Argentine Oil Operations

Accompanied by the top staff of Yacimientos Petroliferos Fiscales, Argentine Government operated oil industry, J. B. O'Connor, Dallas, executive vice president of Dresser Industries, Inc., made a 5,000-mile air tour of the Latin American nation's petroleum facilities. Left to right are: O'Connor, R. Duran, manager of Plaza Huincul field operations; Ing. Juan B. Siri, president and general manager of Y.P.F.; Mario Lavarello, manager of refining; and Jose Messone, general manager of production. The group is pictured at a Plaza Huincul field well in Central Argentina.

dustry by a "consortium" of American companies with antitrust clearance from the Justice Department. Such wholly American operation would probably be resisted by the same British who feel that Anglo-Iranian should be given an active voice in whatever management is agreed on.

New Wafra Well Productive

American Independent Oil Co. has completed the third productive well in Wafra field in the Neutral Zone with tests indicating a sustained capacity of 3,000 bbl. daily.

The well was located about a mile south and a mile east of the last Paril discovery. The three wells thus far completed by Aminoil for the joint account of itself and Pacific Western Oil Co. have a total capacity of about 8,000 bbl. daily. All are shut in pending completion later this year of a pipe line to the Persian Gulf.

Elliott Assigned to Turkey

George R. Elliott, production engineer for Phillips Petroleum Co., Bartlesville, left last week for Ankara, Turkey, as a representative of the United Nations Technical Assistance Administration to aid the government in its search for new oil fields in southeastern Turkey.

A naturalized U. S. citizen, Elliott is a native of Canada. He has been in the production department of Phillips for the past 17 years and organized one of the first groups of reservoir engineers in the industry.

Elliott's work will require evaluation of Turkey's existing oil fields and suggestions of possible ways of developing them to their full capacity. His assignment is for 12 months. *(One of the engineer's best known publications is "Oil Recovery Prediction," which appeared in The Oil and Gas Journal June 16, 1949.)*

Israeli Drilling to Begin

Several of the companies which took out acreage under the Israeli petroleum law passed last year are actively making plans to commence drilling in the near future.

New Continental Oil Co. of Canada is continuing geophysical work started in July in the Negev, Israel's southern desert. The geophysical work is being conducted on behalf of the company by Prof. I. Pakris. Plans are being made for exploratory drilling.

The first company to do exploratory drilling is expected to be Lapidoth-Israel Petroleum Co., jointly financed by the Israel water-works company and American Palestine Trading Corp. Lapidoth-Israel has bought three rigs in the United States, engaged Kerr-McGee as contractor, and plants to test three districts—the area in the vicinity of the south shore of the Dead Sea, the western Negev, and the central southern Negev.

Another local company, Israel Oil Prospectors, has announced that it intends to start drilling in September when its equipment is scheduled to arrive from abroad.

Of the six companies which applied for exploration and drilling licenses, one is American, Husky Oil Co.; another Canadian, New Continental Oil; and four are local concerns.

LATIN AMERICA

Douglas to Drill Off Peru

Douglas Oil Co. of California will launch an intensive drilling program in November on more than 1,000 acres of Peru's Continental Shelf off the producing Lobitos oil field.

Douglas recently signed an agreement with Compania Petrolera Lobitos, a subsidiary of the British company, Lobitos Oilfields, Ltd., covering all Continental Shelf concessions in the Lobitos area.

W. G. Krieger, Douglas president, said the reports of geologists and engineers indicate nearly all the 1,000 acres is proved oil land. There are at least five producing zones in the area ranging from 1,100 to 7,500 ft. The richest is the Parinas zone at 4,600 ft. producing 37° crude.

Douglas has also acquired an option from Empressa Petrolera Fiscal covering 20 miles of coast line from Cabo Blanco north to Mancora Peru. A wildcat is contemplated as soon as a geological survey is completed.

Brazil Bars Foreign Oil Men

Foreign participation in any phase of the petroleum industry in Brazil, except the marketing of imported products was ruled out in the final version of a new oil law passed by the Brazilian Congress.

Efforts by ultranationalists and Communists in the Chamber of Deputies resulted in rejection of Senate amendments which would have allowed limited and highly restricted operations by foreign companies. As sent to President Vasgar for his signature, the bill:

Establishes Petrobras as a government monopoly in exploration and development of domestic reserves, refining of indigenous and imported crude, and transportation of Brazilian crude and products by pipe line and tanker.

Provides a capital for Petrobras of four billion cruzeiros ($500,000,000) to be underwritten by the state, and for increases in this amount through 1956, with the state underwriting at least 51 per cent of the voting shares, and purchase of the remaining shares restricted to Brazilians.

Pemex to Abandon Refinery

Petroleos Mexicanos is making plans to abandon the Arbol Grande refinery near Tampico at an early date.

The refinery has a capacity of 23,000 bbl. daily crude charge and 14,500 bbl. daily in thermal cracking. It is believed to be the first refinery established in Mexico with United States capital. Before the 1938 expropriation, it was operated by Pierce Oil Co.

Antonio J. Bermudez, director general of Pemex, said in Tampico that the equipment would be dismantled and the workers shifted to more profitable plants. The refinery has facilities for lubricating oil, asphalt, and wax manufacturing, but the plant equipment is reported to be old and outmoded.

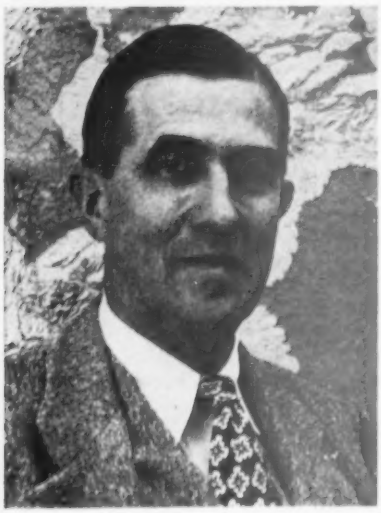
International Briefs

The new Durban, South Africa, refinery of Standard-Vacuum Refining Co. of South Africa, Pty., Ltd., is scheduled to begin initial operations early next year. First test runs probably will get under way shortly after the first of the year. A formal dedication is planned for May. The new refinery, first in South Africa, has a capacity of about 15,600 bbl. daily and includes catalytic cracking and reforming facilities.

Petroleos Mexicanos made another annual payment September 18 to Royal Dutch-Shell on its debt for compensation for the properties of the Shell subsidiary, Cia. Mexicana de Petroleo, El Aguila, S.A., expropriated in 1938. The payment amounted to $8,659,000 and brought the total paid so far to $82,250,000, according to a government announcement in Mexico City. Nine more annual installments will complete the payments.

The Shell organization is making plans to enter the marketing field in Colombia. Three new superservice stations are expected to be opened in Bogota by November, a part of 20 such outlets planned throughout the entire country. Specialty products will be imported, and motor fuel bought from the refinery at Barrancabermeja. Present products marketing in Colombia is entirely by Esso Colombiana, S.A.

PERSONALS



Kimball Promoted

Sinclair Refining names him manager of refineries

THOMAS B. KIMBALL, 23-year veteran of the Sinclair organization, took over October 1 as general manager of refineries of Sinclair Refining Co.

Kimball succeeds John W. Duckett, who has retired after 35 years with Sinclair.

The new manager of Sinclair refineries, who lives in Greenwich, Conn., is now in his thirtieth year in the oil industry since graduating from the University of California in 1923 with a B.S. degree in chemical engineering.

He joined the Sinclair organization in 1930 in the research and development department at East Chicago, Ind. He was successively placed in charge of the cracking division and the process engineering and light-oil development processes at the company's East Chicago refinery before being transferred to New York in 1943. He was named assistant manager of refineries in 1950 —the position he held prior to his present appointment.

Kimball served on several wartime committees during World War II and was active in expanding production of aviation gasoline, particularly by catalytic cracking. During the past several years he has developed numerous patents on light-oil treating and on thermal and catalytic cracking.

Kimball spends much of his free time at home in Greenwich puttering in his garden—his horticultural activity concentrated heavily on growing azaleas. He likes golf and, while at Berkeley, was No. 7 man on the varsity rowing crew.

He is a member of the Board of Deacons of the Second Congregational Church of Greenwich and will be head deacon this year.

He holds memberships in the American Institute of Chemical Engineers and the American Petroleum Institute.

His son, recently married, is a Yale graduate and presently is studying medicine at Cornell Medical Center, New York Hospital.

R. E. Nelson, Jr., general manager of crude-oil supply and products pipe lines, Standard Oil Co. (Ind.), has been elected to the board of directors of the Transportation Association of America.

Gordon W. Van Fossen, junior exploitation engineer for Shell Oil Co., has been transferred from Houston to Elk City, Okla. He was recently graduated from Tulsa University.

J. O. Hendricks, tool pusher for Lowell Drilling Co., has been transferred from Scobey, Mont., to Big Piney, Wyo.

Warren E. Hooper, formerly a driller at Lovington, N. M., for Rowan Drilling Co., Inc., is now drilling superintendent at Odessa, Tex.

Carl R. Brown, formerly a petroleum engineer at Tulsa for Gulf Oil Corp., has joined the U. S. Patent Office in Washington, D. C., as a patent examiner.

Howard Grant, formerly development engineer with Western Gulf Oil Co., Los Angeles, will leave New York early in October for Kuwait to join Kuwait Oil Co., Ltd.

W. B. Dumas has been promoted and transferred by Kerr-McGee Oil Industries, Inc., from party chief at Philip, S. D., to geophysical supervisor at Oklahoma City.

James R. Pace, geophysicist for British-American Oil Producing Co., has been transferred to Houston from Calgary, Alta. He will supervise contract seismic practices in the company's southern division.

Walt Wicker of Casper, Wyo., formerly with Sunray Oil Corp., has joined the geological staff of British American Oil Co., Ltd. He replaces **Alex Aven,** who is on leave of absence for graduate study at Harvard University.

William Vick, formerly with Shamrock Oil & Gas Corp., Amarillo, Tex., has joined the geological staff of Lion Oil Co. at Bismarck, N. D.

G. C. Bell, formerly at Clay City, Ill., has been promoted by Sohio Petroleum Co. to production foreman at Morganfield, Ky.

William A. Castille, formerly assistant division civil engineer at New Orleans for Humble Oil & Refining Co., has been promoted to California area civil engineer at Los Angeles.

Martin Forrer has been transferred by Texas Petroleum Co. from Venezuela to Colombia as assistant chief geologist.

C. W. Miller has opened offices in Denver to handle Rocky Mountain activities of Vickers Petroleum Co., Inc.

DR. WENGERD

Dr. Sherman A. Wengerd, of the University of New Mexico, has been elected president of the Four Corners Geological Society. Other new officers include **Ben F. Baldwin,** Stanolind Oil & Gas Co., Albuquerque, first vice president; **William H. Roberts,** Gulf Oil Corp., Durango, Colo., second vice president; **John R. Gisburne,** Skelly Oil Co., Albuquerque, secretary; and **D. M. Ferebee,** Albuquerque, treasurer.

James B. Fuller, formerly geologist for C. G. Glasscock Drilling Co., has resigned to become a geological consultant in Denver.

Jim Hawkins of Denver, formerly geologist for Lion Oil Co., has joined Globe Oil & Gas Corp.

J. N. Park, Jr., Midland, Tex., has been elected chairman of the Permian Basin chapter of the American Association of Oilwell Drilling Contractors. Park, division superintendent in West Texas and southeast New Mexico for Rowan Drilling Co., Inc., succeeds **J. S. Bell,** also of Midland with Henry Black & Sons. Other new officers are **Harry Woodward,** assistant superintendent for Thompson-Carr, Inc., Odessa, Tex., vice president; and **Paul Shaffer,** engineer for Thompson-Carr, Odessa, secretary-treasurer.

PERSONALS

Walter O. Martin has been promoted by Texas Petroleum Co. from senior petroleum engineer in Venezuela to assistant division engineer in Colombia.

F. G. Engstrom, formerly group leader in the process-engineering department of the Standard Oil Co. (Ohio) refinery at Lima, has been promoted to chief process engineer at the company's Toledo refinery. He succeeds **J. L. Collins,** who is now operations-control assistant.

Dr. E. C. Hughes, chief of the chemical and physical research division of Standard Oil Co. (Ohio), has been named chairman of the management committee for this year's Gordon research conferences. About 30 of the 1-week meetings are being planned for the generation of new ideas among top scientists. The conferences are sponsored by the American Association for the Advancement of Science.

Dwight Daniels and **Jack Mason,** petroleum engineers, have been transferred from Ashland to Henderson, Ky., by Ashland Oil & Refining Co., Inc. Other recent changes of petroleum engineers by Ashland include **W. H. Harrington,** Midland, Tex., to Henderson; **Paul Sturm,** Henderson to Ashland as division engineer in charge of secondary-recovery operations; **Morris Sechman,** Henderson to Ashland; **William Schreiber,** Ashland to Midland; and **James Copen,** geologist, Ashland to Billings, Mont. **Norman G. Miller** has joined the firm at Oklahoma City as Kansas geologist, and **James Brewer** has been employed as junior geologist at Ashland.

H. E. Rowe, Jr., petroleum engineer for 6 years with Stanolind Oil & Gas Co., has joined Beach & Talbot, Tulsa.

E. V. Smith has been named superintendent of Petroleum Terminal Co.'s new terminal at Spokane, Wash. Smith formerly was refinery superintendent at Spokane for Phillips Petroleum Co., of which Petroleum Terminal is a subsidiary.

H. G. Van Horn has resigned from Shell Oil Co. in Corpus Christi, Tex., to join Colorado Interstate Gas Co. as a petroleum engineer at Colorado Springs.

F. W. Hertel, coastal district production superintendent for Tide Water Associated Oil Co. at Ventura, Calif., has been promoted to general superintendent of the district. **William Goold,** previously assistant production superintendent, has been promoted to replace Hertel. **Russell Hodgson** of Ventura has been made chief petroleum engineer, succeeding **Joe Jensen,** Los Angeles, who became assistant to the vice president. Hertel, who joined Tide Water in 1921, is now in charge of company activities in Ventura and Santa Barbara counties.

Pike Distributes $110,000 in Profit-Sharing Checks

Profit-sharing checks totalling $110,000 were distributed by Thomas P. Pike Drilling Co., Los Angeles, among the company's 224 employes at their recent annual picnic. Seen just prior to the cutting of the "profit melon" are, left to right, Stanwood I. Williams, executive vice president; Sim Protiva and Earl Kirkland, tool pushers; T. P. Pike, president; and H. G. Haney, vice president in charge of drilling.

Zack Taylor, drilling superintendent for Falcon Seaboard Drilling Co., has been transferred from Sterling, Colo., to Denver.

Edward P. Boyle, president of the Derrick Publishing Co., Oil City, Pa., publishers of the Oil City Derrick, has been elected to the board of directors of South Penn Oil Co.

William L. Carr, district geologist at Bismarck, N. D., for Pure Oil Co., has been elected president of the North Dakota Geological Society to fill the unexpired term of **W. E. Lumb,** Northern Natural Gas Co. district geologist who has been transferred to Billings, Mont.

Alton C. Goodrich has been transferred to Dallas by Seabord Oil Co. of Delaware. He formerly was field engineer for Seaboard at Vealmoor field north of Big Spring, Tex.

A. S. Hawley, geologist formerly at Bakersfield, Calif., with Union Oil Co. of California, has joined Western Gulf Oil Co. at Sacramento, Calif.

Paul Beckemeyer, production foreman for Ohio Oil Co., has been transferred from Noble, Ill., to Shelburn, Ind.

Thomas P. McCann, formerly geologist at Tulsa for Shell Oil Co., has been made district geologist for Shell at Evansville, Ind.

Thomas P. Pike, president of Pike Drilling Co., Los Angeles, has been appointed deputy assistant Secretary of Defense for supplies and logistics. Pike will be particularly concerned with a program to increase efficiency throughout the military organization by establishing realistic policies for production, procurement, and handling of military supplies. This will determine priorities and appraise military strategy in terms of availability of materials.

Robert Siegel, of Socony-Vacuum Oil Co., Inc., has been named vice president in charge of Middle East affairs and elected to the board of directors. He fills the vacancy left by the death September 23 of Charles L. Harding. Siegel formerly served as manager of foreign production of Socony-Vacuum, president of Socony-Vacuum Oil Co. of Venezuela, and as president of Socony-Vacuum Overseas Supply Co. prior to his recent election to the board. He has been succeeded as

PERSONALS

head of Socony-Vacuum Overseas Supply by **A. C. Ingraham,** who was executive assistant to the coordinator of Middle East interests for Socony-Vacuum before joining Overseas Supply in November 1951.

J. C. Smyth, senior research chemist in the Hopewell development department of Allied Chemical & Dye Corp.'s nitrogen division, has been promoted to plant chemist of the new petrochemical plant being built at Orange, Tex.

MONTGOMERY

J. G. Montgomery, Jr., vice president since 1939 of United Natural Gas Co. and associated companies, Oil City, Pa., has been made executive vice president, a newly created office. **Harry B. Wood** and **John A. Comet** have been elected vice presidents and directors. **Howard C. Rose** was elected secretary-treasurer and a director, and **Lawrence J. Fleckenstein,** an employe of United for 36 years, was appointed assistant treasurer. Wood joined United in 1924 and has been chief district commercial manager since 1949. Comet has been with the firm since 1934 and was promoted to chief geologist in 1952. Rose, who has been with United since 1933, succeeds **Marton J. Talley,** who retired October 1.

Tom P. Walker, Transcontinental Gas Pipe Line Corp., **Hy Bird,** Gulf Interstate Gas Co., and **Marion Banks,** Southern California Gas Co., were elected to vacancies on the board of directors of the Independent Natural Gas Association of America at the organization's annual meeting in Houston, September 28-29. All other officers were reelected.

Franz von Schilling, Jr., of California-Texas Oil Co., Ltd., and **David H. West** have been appointed to posts in the foreign operations section of the Petroleum Administration for Defense. Schilling, who has been in California-Texas foreign operations for nearly 30 years, was named director of the foreign supply and transportation division. He previously had been assistant director of the division. West has been made assistant deputy administrator in charge of foreign activities. He had been acting assistant deputy since June. *(The Oil and Gas Journal, June 8, p. 83.)*

Jack N. Waggoner, petroleum engineer for Gulf Oil Corp., has been transferred from Crane to Iraan, Tex.

B. W. Fancher, formerly drilling engineer at Midland, Tex., for Atlantic Refining Co., has joined H. A. Trueblood as geological engineer at Denver.

Arnold M. Tibbetts, formerly geophysicist at Tulsa for Pure Oil Co., has joined Petroleum Geophysical Co. as party chief at Aurora, Colo.

George M. Parker has been elected executive vice president of Esso Export Corp., an affiliate of Standard Oil Co. (N.J.). He succeeds **L. K. Blood,** who will continue as a director and will be available for special assignments. Parker has been a vice president since 1950.

Ford L. Johnson has been appointed acting director of research and development activities for Sun Oil Co.'s production department. Johnson, who is manager of Sun's physical laboratory at Newtown Square, Pa., has charge of directing and coordinating the activities carried on in the various laboratories and field offices of the production department. He is maintaining his headquarters at Newton Square. **Preston E. Chaney,** manager of the production laboratory at Beaumont, Tex., is assistant director in charge of exploitation. **C. N. White** has been appointed administrative assistant to Johnson.

Robert R. Park, formerly an engineer at Charleston, W. Va., with United Fuel Gas Co., has joined Gulf Interstate Gas Co. at Campbellsville, Ky.

Harold M. Smotherman, formerly reservoir engineer for Cities Service Oil Co. at Bartlesville, Okla., has been transferred to Odessa, Tex., as production engineer.

Norman A. Olansen, formerly field engineer at West Columbia, Tex., for The Texas Co., has been named reservoir engineer at Alice, Tex.

Walter B. Saner, production engineer, has been transferred from Corpus Christi, Tex., to Bishop, Tex., by The Chicago Corp.

J. M. Grant, Loffland Brothers Co., has been elected chairman of the California chapter of the American Association of Oilwell Drilling Contractors. He succeeds **J. K. Kellogg,** K. C. Kellogg & Sons. **Robert Walker,** Brown Drilling Co., was named secretary-treasurer, succeeding **C. K. Eastman,** California Production Service, Inc.

DEATHS

John T. Rynd, 64, vice president and general manager of Texas Pipe Line Co., died September 30 in Houston. He began work in the oil fields for Pure Oil Pipe Line Co. and National Transit Pipe Line Co. in West Virginia. He worked as a telegrapher for Prairie Oil & Gas Co. at Bartlesville, Okla., in 1912, and a year later joined Texas Pipe Line. He was named head of the oil-movement division in 1939, and later was named division manager. He was promoted to vice president and general manager last year after having served 5 years as assistant general manager.

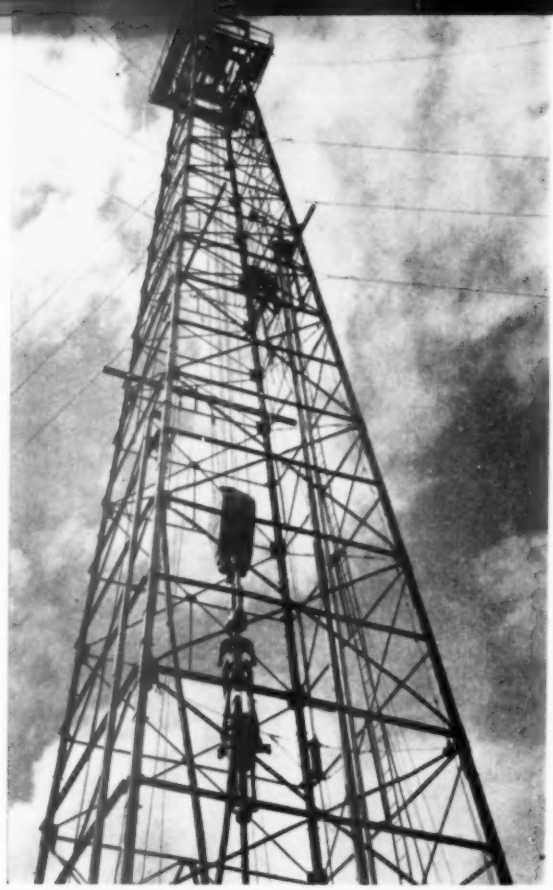
John L. O'Conner, 51, died recently at Delano, Calif. He was production superintendent in Trico field for Standard Oil Co. of California and had been with the firm for 30 years.

Louis A. Scholl, Jr., 65, retired geologist and geophysicist for The Texas Co., died recently in Houston. He had been with the company 36 years and upon his retirement December 31, 1952, was geophysical consultant on the staff of the general manager of the producing department. Scholl was chief of the geophysical division from 1929 until he was named to his last post in 1950.

C. E. Gomez, civil engineer for Texas Petroleum Co., was killed recently when a company airplane and a Colombian Air Force plane collided near Bogota. Three crew members of the company aircraft also were killed.

Raymond D. Lepley, 61, construction engineer for Atlantic Refining Co., died recently in Philadelphia.

Edward M. Borger, 53, died recently at Sewickley, Pa. He retired September 1 after being president since 1940 of Peoples Natural Gas Co., Pittsburgh. He also had been chairman of the board of directors of New York State Natural Gas Corp. and a director of Consolidated Natural Gas Co.

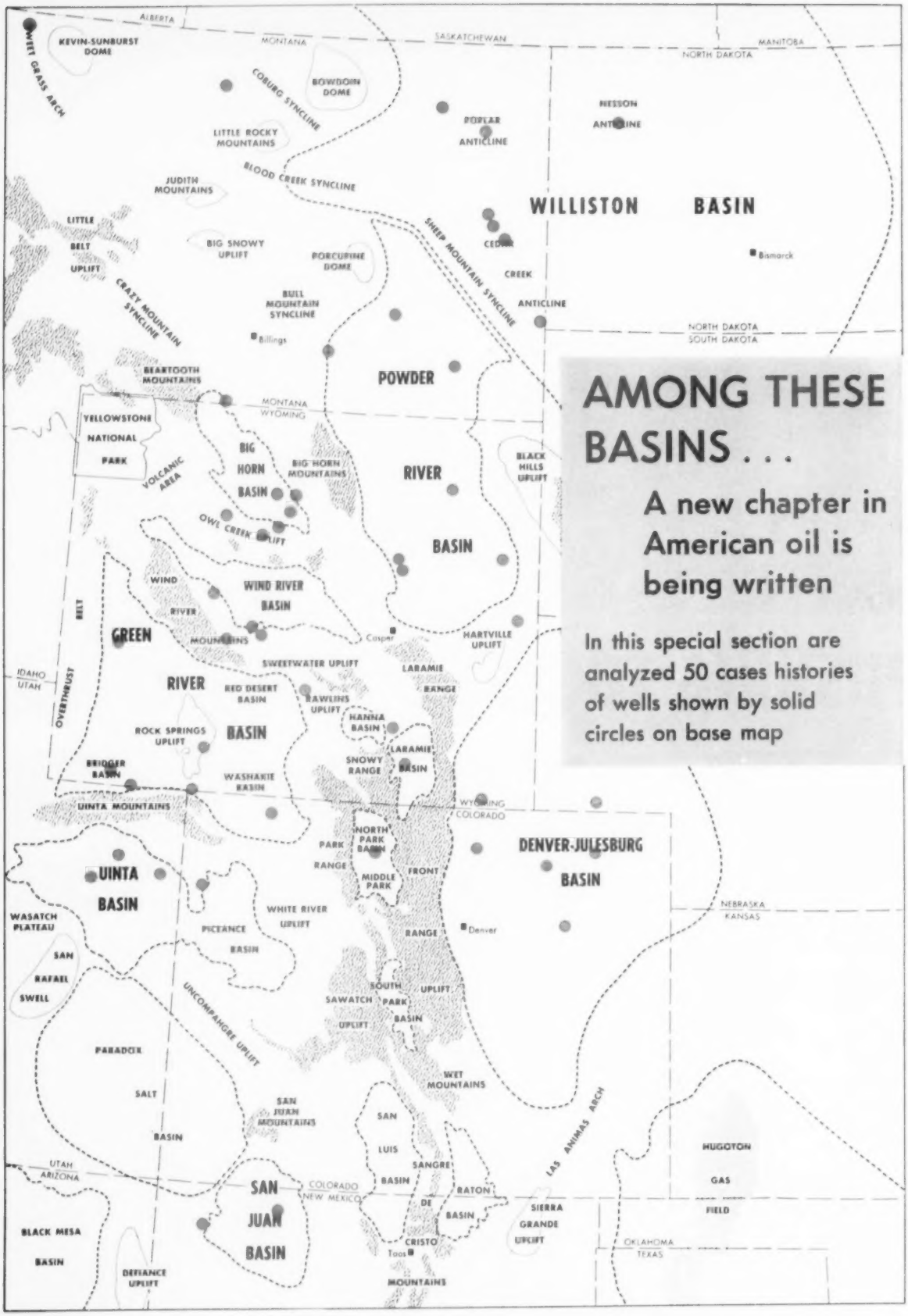


A SPECIAL SECTION

TODAY'S DRILLING CONTRACTOR goes into a new region armed with vital factual data on actual hole-making conditions. From well-kept records obtained from key wells drilled in the past, he knows what size rig should be selected to do the job best. He finds out in advance conditions on penetration rates; he predicts the number of drilling days and bits that will be required to reach contract depth. He ascertains prevailing practices as to what size bits will be required to cut hole for setting surface, intermediate, or long strings. He studies his formations and plans a mud program to protect the bore hole and to prevent circulation losses.

Planning stems from fact-finding. To keep the Rocky Mountain drilling contractor informed on recent drilling conditions experienced in each portion of the province, The Oil and Gas Journal presents in this section a series of 50 important case histories taken from actual wells drilled within the confines of the 11 basins and 2 uplifts.

PUSHING TOOLS . . . in the Rockies



AMONG THESE BASINS . . .

A new chapter in American oil is being written

In this special section are analyzed 50 cases histories of wells shown by solid circles on base map

Here Are 50 Case Histories

. . . Covering a wide variety of drilling conditions, in 13 different Rocky Mountain areas

THICK SEDIMENTARY sections of the Intermontane basins in the Rocky Mountains are now the scene of intensified exploration and development drilling. Recent completion of major crude-oil pipe lines connecting formerly isolated producing areas with Middle West refining centers, coupled with new products pipe lines, has served to bolster production from these once market-isolated basins.

DRILLING PROBLEMS in the Rocky Mountain province differ from basin to basin. Moreover, penetration differs from one formation to another. In short, there's more "difference" from drilling spot to drilling spot, here in this territory. To help point up these practical problems to the drilling contractor, The Oil and Gas Journal presents this comprehensive analysis of wells selected from each of these major basins.

BASIN BY BASIN, these analyses comprise a series of detailed case histories which present basic data in tabular form. From these facts are drawn a tailor-made discussion of drilling conditions found in each well. While these emphasize penetration rates and bit performance, particular attention also is given to the following:

- Distribution of rig time.
- Lost-circulation and mud programs.
- Bore-hole and casing programs.
- Cementing practices.
- Diamond coring.

THE COMPOSITE SERIES of wells selected should not necessarily be construed to represent typical or average drilling conditions in the various parts of the Rocky Mountain region covered—because of the diversification of drilling conditions not only from basin to basin, but also within basins. They represent characteristics in specific wells, which may vary considerably as to degree of typification.

Furthermore, importance of such factors as drilling-fluid characteristics, drilling weights, rotary speeds, drill collar practice, straight-hole record, pump pressures, and zones of lost circulation on penetration through various stratigraphic sections at different depths and structural conditions are not reflected by the tabular summaries.

Complete charted analyses showing the effect of all these factors are made available to Rocky Mountain drilling contractors and oil operators by E. A. Polumbus, Jr., Denver, petroleum consultant who maintains a comprehensive monthly drilling analysis service. Polumbus' group furnished the data included in this presentation.

In this section will be found analyses of individual wells covering the following: Williston basin, Bowes dome, Sweetgrass arch, Powder River basin, Big Horn basin, Wind River basin, Green River basin, Hanna basin, Laramie basin, North Park basin, Denver-Julesburg basin, Uinta basin, and San Juan basin.

Williston Basin— North Wolf Point Pool (6,400-Ft. Pay) WI-1

Well—Continental Oil Co. 1 Fast, C NE SE 14-30n-46e, Roosevelt County, Montana.

Contractor—Pioneer Drilling Co., Inc., Casper, Wyo.

Spud—10-17-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½ (12¼)	13⅜	335	275
Long	9	5½	6,448	250

DISTRIBUTION OF RIG TIME
(From Spud Date to Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	27.3	63.5
Coring and reaming (including trips)	3.0	7.0
Mechanical downtime	1.8	4.2
Mix mud, hole condition	0.7	1.6
Circulate samples, wait on orders	1.2	2.8
Schlumberger	1.2	2.8
Drill-stem test	1.2	2.8
Casing—reaming, running, WOC	6.6	15.3
Total	43.0	100.0

Pushing Tools—Williston Basin

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	1	340	13.0	26.2	340	13.0
9	29	6,088	510.5	11.9	210	17.6
			Reaming			
17½	1	340	10.3	33.0	340	10.3
9	1	71	11.8	6.0	71	11.8
			Coring			
*6⅛	1	71	29.5	2.4		

*Diamond bit.

Mud additives to total depth . . . Bentonite, 29,400 lb.; barite, 2,300 lb.; brine gel, 3,920 lb.; starch, 12,200 lb.; gypsum, 3,000 lb.; preservative, 835 lb.; Driscose, 400 lb.; quebracho, 150 lb.; soda bicarb, 200 lb.; hulls, 10 sacks.

Drilling Comments and Discussion

This recent discovery on the northwest side of the Williston basin was completed in the Mission Canyon limestone at 6,448 ft. The well is located about 30 miles west and north of the East Poplar area.

A comparison of this well with the East Poplar area indicates penetration was somewhat more rapid. The following table compares penetration to 5,500 ft. between this well and the East Poplar well:

SURFACE TO 5,500 FT.

Well—	Net days	Rot. days	No. bits	Ft./net day	Ft./rot. day	Ft./ bit
Continental 1 East Murphy Corp. 8 E. Poplar Unit	15.9	13.5	19.2	346	407	286
	18.5	13.5	25.7	297	407	214

Crooked-hole tendencies and circulation losses did not present a problem in this well. The 3.8-day spread between the rotating and net curves at 5,800 ft. indicates 4.1 hours per trip for the 22 trips plus rig service and drift surveys.

●

Williston Basin— WI-2
East Poplar Field (5,800 Ft. Pay)

Well—Murphy Co. 8 East Poplar Unit, C NW SE 10-28n-51e, Roosevelt County, Montana.
Contractor—Cook Drilling Co., Casper, Wyo. **Spud.** 8-1-52.
Rig description—Atlas draw works mounted on a 127-ft. jackknife derrick and 9-ft.-high, 24-ft. substructure; motors—two LRO 750-hp. engines; pumps—one C-350 7¼ by 18-in., and one 150-B 6¾ by 12-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	12¼	9⅝	960	330
Long	*8¾-‡7⅞	5½	5,766	250

*Drilling to 5,600 ft. ‡Coring to 5,600-5,788 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	20.2	56.6
Coring and reaming (incl. trips)	1.8	5.0
Mechanical downtime	3.7	10.4
Mix mud	0.1	0.3
Survey—Schlumberger	0.3	0.8
Casing—running, WOC	4.7	13.2
Completion—perforate, acidize, flow and test well	4.9	13.7
Total	35.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	1	969	27.5	35.3	969	27.5
8¾	25	4,631	322.5	14.4	185	13.3
7⅞	1	117	22.25	5.3	117	22.25
			Coring			
7⅞	1	71	22.75	3.1		

Mud additives . . . Bentonite, 12,500 lb.; tannex, 315 lb.; caustic, 120 lb.; gypsum, 1,450 lb.; Impermex, 390 lb.; Baroid, 14,600 lb.; Zeogel, 1,920 lb.; preservatives, 500 lb.

Drilling Comments and Discussion

Drilling characteristics in the East Poplar area of the Williston basin, Montana, are indicated by analyses of the discovery well and a recent development well.

The discovery well was drilled to a total depth of 9,163 ft. and tested the Ordovician. It was subsequently plugged back to 5,827 ft. and completion in the Madison. This area is to date the shallowest commercial production in the Montana portion of the Williston basin.

Outstanding features of this well is the large amount of hole solidly cored below the 7-in. casing point (3,321 ft. cored) requiring 28 diamond core heads. Only 71 ft. of core was cut in the development well. Net-progress curves indicate penetration rate was nearly the same in the discovery as in the recent well. To 5,000 ft., 25.3 net days and 19.5 rock bits were required in the discovery as opposed to 24.3 net days and 18 rock bits to 5,000 ft. in the development well.

This discovery well was one of the few recent Williston basin wells drilled to total depth with a bentonite mud, common practice is to convert to a gyp-base or salt-base mud below the Jurassic section. Drilling weights of the two wells were not available.

●

Williston Basin— WI-3
Beaver Lodge Field (8,600 Ft. Pay)

Well—Amerada Petroleum Corp. 1 Alvin Iverson, C NE SE 14-155n-96w, Williams County, North Dakota.
Contractor—Loffland Brothers Co., Tulsa. **Spud**—3-31-52.
Rig description—Model 100 draw works mounted on 136-ft. derrick; motors—three 300-hp. engines each; pumps—one C-250 7½ by 15-in., and one C-350 7½ by 18-in.; 20½-in. rotary table.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	700	675
Long	8¾	7	8,601	600

DISTRIBUTION OF RIG TIME
(From Spud Date to Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	25.3	70.9
Mechanical downtime	1.1	3.1
Mix mud, lost circulation, hole condition	1.1	3.1
Surveys—Schlumberger and Lane-Wells	2.5	7.0
Drill-stem test	1.0	2.8
Fishing	0.5	1.4
Casing—reaming, running, WOC	4.2	11.7
Total	35.7	100.0

Drilling Comments and Discussions

This development well in active Beaver Lodge field of Williston basin reflects improvement in drilling efficiency

Pushing Tools—Williston Basin

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
15	1	710	15.3	46.4	710	15.3
8¾	35	7,890	4,575	17.2	225	13.1

Mud additives . . . Bentonite, 4,200 lb.; caustic, 800 lb.; quebracho, 500 lb.; Driscose, 700 lb.; Kembreak, 1,150 lb.; starch, 20,040 lb.; preservative, 1,850 lb.; Sapp, 350 lb.; Magco phos, 50 lb.; $CaSO_4$, 300 lb.; oil, 7 lb.

as a result of experience in the area. The following table compares penetration characteristics of this well with the Beaver Lodge discovery:

SURFACE TO DAKOTA

	Well A*	Well B†
Thickness interval	4,620	4,520
Net days	6¼	3½
Feet per net day	750	1,290
No. new hole bits	6	4
Feet per bit	700	1,130
Over-all days	15½	5¾

DAKOTA TO 8,600 FT. (IN MADISON)

Thickness interval	3,980	4,080
Net days	32¾	21¾
Feet per net day	121	188
No. new hole bits	31	32
Feet per bit	128	128
Over-all days	39¾	26

*Amerada Petroleum Corp. 1 Clarence Iverson, C SW SW 6-155n-95w. †Amerada Petroleum Corp. 1 Alvin Iverson, C NE SE 14-155n-96w.

In general, improvement is primarily attributable to drilling with thinner muds and using higher pump pressures. The discovery well drilled 13¾-in. hole to 1,200 ft. and 9⅞-in. hole to 8,600 ft., whereas subject well drilled 15-in. hole to 710 ft. and 8¾-in. hole to 8,600 ft.

Drilling weights employed in subject well were 5 to 10 tons greater. No coring was done in either well to 8,600 ft. On the development well, the 5½-day spread between the rotating progress and net progress curves indicates relatively high efficiency with an average of only 4.1 hours per normal trip including rig service, drift surveys, etc.

●

Williston Basin— Little Beaver Field (8,500 Ft. Pay) WI-4

Williston basin—Little Beaver field (8,500-ft. pay).

Well—Shell Oil Co. 1 Little Beaver Unit, C NE SW 13-4n-61e, Fallon County, Montana.

Contractor—Loffland Bros Co., Tulsa. **Spud**—3-3-52.

Rig description—Model 100 draw works with a 136-ft. mast; motors—three 300 hp. engines each; pumps—one C-250 7½ by 15-in. and one C-350 7¼ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½ (12¼)	13⅜	1,009	784
Long	9	7	8,553	500

DISTRIBUTION OF RIG TIME
(From Spud Date to Setting Long String)

	Days	Per cent
On bottom, normal trips, rig service, etc.	40.1	37.2
Coring and reaming (incl. trips)	30.7	28.4
Mechanical downtime	4.2	3.9
Mix mud, hole condition	3.8	3.5
Surveys—Schlumberger	3.5	3.2
Drill-stem test	11.6	10.7
Circulate samples, WOC	1.6	1.5
Fishing and drilling junk	1.5	1.4
Weather	1.1	1.0
Casing—reaming, running, WOC	9.9	9.2
Total	108.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft. bit	Hours on bot./bit
			Drilling			
12¼	1	1,045	23.0	45.4	1,045	23.0
9	46.3	6,430	656.2	97.9	139	14.2
			Reaming			
17½	1	1,008	16.0	63.0	1,008	16.0
9	1.7	395	17.5	22.6	232	10.3
			Coring			
8¾	1	165	29.8	5.6		
8⅞	5	920	351.5	2.6		

Mud additives . . . Bentonite, 21,700 lb.; tannins, 675 lb.; caustic, 325 lb.; soda ash, 200 lb.; Zeogel, 49,680 lb.; Impermex, 32,325 lb.; salt, 95,500 lb.; preservative, 2,415 lb.

Drilling Comments and Discussion

This Ordovician discovery well lies in the southernmost producing field on the Baker-Glendive trend. Total depth of the well is 8,500 ft. with 1,085 ft., or 13 per cent, of the hole cored.

The following table compares penetration to the Charles in this well with the Pine Unit discovery located 50 miles northwest and a recent Glendive area well 80 miles northwest.

SURFACE TO CHARLES

	Well A*	Well B†	Well C‡
Depth, ft.	6,350	7,100	7,200
No. rotating days	19.7	20.0	15.5
No. bits	30.5	31.7	29.5
Feet per rotary day	322	355	465
Feet per bit	208	224	244
Drilling weight, M lb.	3-13	2-10	2-5
Table speed, r.p.m.	80-180	75-150	90-120

*Shell Oil Co. 1 Little Beaver Unit, Little Beaver field, Fallon County, Montana. †Shell Oil Co. 1 Fee, Pine Unit discovery well, Wibaux County, Montana. ‡Texas Co. 1 NPB (NCT-4) Glendive field well, Dawson County, Montana.

A straight hole was drilled with maximum drift of 1¼°. The 5.1-day spread between the rotating and net progress curves indicated 5.1 hours per trip were required for the 24 normal trips for dull bits at 6,300 ft. This time includes time spent for drift surveys, rig service, changing bits, etc.

●

Williston Basin— Glendive Area Wildcat (9,500 Ft.) WI-5

Well—Williston Oil & Gas Co., and Delta Drilling Co., 1 Trangmoe, SW NE NW 6-14n-55e, Dawson County, Montana.

Contractor—Delta Drilling Co., Tyler, Tex. **Spud**—6-14-52.

Rig description—Model GA 500 draw works mounted on a 129-ft. jackknife derrick; motors—two 260-hp. diesel engines each; pumps—one 7⅜ by 16-in., and one 7¼ by 14 in.; 17½-in. rotary table.

Pushing Tools—Williston Basin

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	12¼	9⅝	508	200
Surface	8¾	7	1,635	50
Long	*8¾-†6⅛	5½	9,025	70

*Drilling 508 to 8,484 ft. †Coring 8,484 to 9,500 ft.

DISTRIBUTION OF RIG TIME
(Tabulated From Rotary Drilling to Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	57.3	55.6
Coring (including trips)	22.2	21.5
Mechanical downtime	4.0	3.9
Mix mud, hole condition	1.0	1.0
Circulate samples, wait on orders	0.5	0.5
Surveys—Schlumberger, Lane-Wells	1.1	1.1
Drill-stem tests	1.5	1.5
Fishing and stuck pipe	6.0	5.8
Plug back	3.0	2.9
Casing	6.4	6.2
Total	103.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	2	501	35.5	14.1	250	17.7
8¾	51	7,859	1,001.0	7.9	154	19.6
			Coring			
*8⅝	1	55	23.3	2.4		
*6⅛	3	1,009	292.3	3.5		

*Diamond bits.

Mud additives . . . Bentonite, 13,900 lb.; gypsum, 750 lb.; preservative, 2,220 lb.; Driscose, 300 lb.; brine gel, 2,400 lb.; bicarb, 200 lb.; starch, 18,450 lb.

Drilling Comments and Discussion

This Glendive area exploratory well was drilled to a depth of 9,484 ft. to test the Cambrian rocks. Crooked hole tendencies did not appear to be a problem as would be expected in this area. Pipe was stuck at 1,320 ft. while at a depth of 5,480 ft. and 7-in. casing was cemented at 1,635 ft. to prevent recurrence of difficulties of this type.

The following table compares drilling performance of subject well with other wells drilled in this area:

SURFACE TO CHARLES

	A	B	C	D	E	F	G
Thickness interval, ft.	6,930	7,010	7,060	7,430	7,200	7,080	6,930
Net days	32	27	25.4	24	22.5	23.8	29.4
No. bits	36	33	26	24	29	24	31
Ft./net day	216	256	278	309	320	297	236
Ft./bit	192	212	272	309	248	295	224
Drlg. wt., M tons	10	9	10	13-15	2-5	7-18	5-17½

CHARLES TO TOTAL DEPTH

Thickness interval, ft.	2,149	2,192	3,126	703	2,928	2,996	†1,490
Net days	*39	*29.3	*48.5	*8	*44	*50.9	29.1
No. bits	*52	*44	*55	*10	*54	*57	22
Ft./net day	55	75	65	88	67	59	51
Ft./bit	39	48	57	70	54	52	68
Drlg. wt., M tons	18-20	10-12	14-20	15	6	11-15	15

*Estimated, assuming no coring and reaming. †To coring point.
A—Texas Co. 1G N.P.R.R., Glendive field, Dawson County, Montana.
B—Shell Oil Co. 34-26G, Glendive field.
C—Texas Co. 1 NPG (NCT 2), Glendive field.
D—Texas Co. 1 NPG (NCT 8), Glendive field.
E—Texas Co. 1 NPG (NCT 4), Glendive field.
F—Texas Co. 1 NPG (NCT 6), Glendive field.
G—Williston Oil & Gas Co. and Delta Drilling Co. 1 Trangmoe, Glendive field.

Penetration in this well is somewhat slower than in the majority of the other wells charted. Noteworthy in this well is speeding of penetration by diamond coring of the lower 1,000 ft. of hole.

●

Williston Basin— WI-6
Sand Creek Wildcat (9,200 Ft.)

Well—Williston Oil & Gas Co. 1 Government, C NE NE 14-15n-54e, Dawson County, Montana.

Contractor—Delta Gulf Refining Co., Tyler, Tex.

Spud—8-13-52.

Rig description—Model 75 draw works mounted on a 129-ft. jackknife derrick; motors—one PTD 6, 300 hp., and one LI-600, 250 hp.; pumps—one C-350 7¾ by 18-in., and one C-150 6¾-in. by 12-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	464	233
Long	*9-†8⅝	7	9,100	265

*Drilling 464 to 8,750 ft. †Diamond coring 8,750 to 9,200 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Setting Oil String)

	Days	Per cent
On bottom, normal trips, rig service, drift surveys, etc.	50.0	58.8
Coring (incl. trips)	14.8	17.4
Mechanical downtime	2.8	3.3
Mix mud, lost circulation, hole condition	4.0	4.7
Circulate samples, wait on orders	5.1	6.0
Surveys—Schlumberger and Lane-Wells	0.9	1.1
Drill-stem test	1.3	1.5
Casing—reaming, running, WOC (wait on cement 2 days)	6.1	7.2
Total	85.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
15	½	208	8.5	24.5		
9	43	8,531	921.8	9.3	194	21.4
8¾	1	1	Drill packer rubber			
			Reaming			
15	½	272	3.0	90.1		
			Coring			
8⅝	2	469	188.0	2.5		

*Diamond bits.

Mud additives . . . Bentonite, 28,600 lb.; caustic, 185 lb.; quebracho, 575 lb.; lime, 500 lb.; gypsum, 4,600 lb.; starch, 23,850 lb.; salt gel, 39,360 lb.; preservative, 3,750 lb.; soda ash, 350 lb.; hulls, 23 sacks; fiber, 12 sacks.

Drilling Comments and Discussion

This Glendive extension well in the Montana portion of the Williston basin is situated 1 mile east of Shell Oil Co. 24-36-G Government. Penetration characteristics in these two wells are similar but the Shell well experienced a slightly higher rate. Drilling weights carried on the bit are considerably less than total weight of drill collars used.

Williston Basin— Deer Creek Field (10,000 Ft. Pay) WI-7

Well—Texas Co. 1 Ekland, C NE NW 26-17n-53e, Dawson County, Montana.

Contractor—Will I. Lewis Drilling Co., Denver, Colo.

Spud—11-3-52.

Rig description—Model 76 draw works mounted on a 133-ft. mast; motors—three LRO engines; pumps—two 7¼ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17¼ (95⁄8)	13⅜	338	275
Long	9	7	10,217	500

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	72.4	63.8
Coring and reaming (including trips)	6.5	5.7
Mechanical downtime	2.6	2.3
Mix mud, hole condition	5.2	4.6
Circulate samples, wait on orders	0.1	0.1
Surveys—Schlumberger and Lane-Wells	1.3	1.2
Drill-stem test	6.8	6.0
Stuck pipe, fishing	5.9	4.4
Casing—reaming, running, WOC	7.6	6.7
Completions—run tubing, perforate, acidize, flow	5.8	5.2
Total	113.3	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9⅝	1	370	7.5	49.0	370	7.5
9	79.3	9,754	1,192.5	8.2	123	13.8
		1—9-in. bit—clean hole				
			Reaming			
17½	331	338	80.0	42.2	338	8.0
9	2.7	96	22.8	4.2	36	11.8
			Coring			
6⅛-in. dia.*	2	96	35.5	2.7	....	....

*Diamond bits.

Mud additives . . . Bentonite, 72,800 lb.; brine gel, 39,120 lb.; lime, 8,400 lb.; starch, 37,750 lb.; Driscose, 1,000 lb.; caustic, 19,030 lb.; quebracho, 12,120 lb.; preservative, 120 lb.; soda bicarb. 100 lb.

Drilling Comments and Discussion

This well was analyzed to indicate the case history of a more difficult penetration below the Dakota than is indicated on other wells studied in this immediate area. This difference in penetration rates is shown in the following table:

SURFACE TO DAKOTA

	Well A	Well B	Well C
Thickness interval	4,600	4,460	4,500
Rotating days	4.8	5.5	6.7
No. bits	5.5	7.0	10.5
Feet per rotating days	958	812	672
Feet per bit	836	638	428
Drilling weight, M. tons	....	2-5	4-9
Table speed, r.p.m.	....	90-120	90-120
Pump pressure, psi.	....	650-1,000	600-900

DAKOTA TO CHARLES

Thickness interval	2,860	3,350	3,350
Rotating days	13.2	*15.2	19.8
No. bits	17.5	*33	22.5
Feet per rotating days	217	220	169
Feet per bit	163	102	103
Drilling weight, M. tons	12-15	5-6	8-15
Table speed, r.p.m.	60	90-120	55-90
Pump pressure, psi.	600-900	750-900	900-1,000

CHARLES TO 10,000 FT.

Thickness interval	2,190	2,150
Rotating days	*21.5	22.0
No. bits	*41	34.5
Feet per rotating days	102	98
Feet per bit	53	62
Drilling weight, M. tons	6	15-20
Table speed, r.p.m.	90	55
Pump pressure, psi.	900	900-1,100

*Estimated, assuming no coring.

A—Texas Co. 1 NPG (NCT-8), Glendive field, Dawson County, Montana.

B—Texas Co. 1 NPG (NCT-4), Glendive field, Dawson County, Montana.

C—Texas Co. 1 Ekland, Deer Creek field, Dawson County, Montana.

Most wells in the Williston basin analyzed to date have been drilled with a gypsum-base mud. However, subject well was drilled with a high pH lime mud.

●

Bowes Dome— Bowes Field (3,400 Ft. Pay) BD-1

Well—Texas Co. 4 A. E. Cole, NE SE SE 2-31n-19e, Blaine County, Montana.

Contractor—Taylor Drilling Co., Lewistown, Mont. **Spud**—4-16-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾ (9)	10¾	106	65
Long	9	7	3,406	100

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	10.3	54.1
Coring and reaming	3.3	17.4
Mechanical downtime	0.8	4.2
Mix mud, condition hole	0.3	1.6
Schlumberger	0.1	0.5
Casing	3.9	20.6
Completion (run tubing)	0.3	1.6
Total	19.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	13	3,387	177.3	260.5	19.1	13.6
			Reaming			
13¾	1	115	2.0	115	57.5	2.0
9	1	97	20.5	97	4.7	20.5
			Coring			
6⅛*	1	97	40.5	97	2.3	40.5

*Diamond bit.

Mud additives . . . Bentonite, 4,900 lb.; soda bicarbonate, 250 lb.; Tanathin, 450 lb.; caustic, 185 lb.

Drilling Comments and Discussion

In this Bowes field pool well in the Bearpaw Mountain area of North Central Montana, penetration was rapid

to the Sawtooth at 3,415 ft. and only 9.8 net days and 7.3 rotating days were consumed. Spread of 2.5 days between net and total rotating days at 3,400 ft. indicates an average of 4.6 hours were required for the 13 normal trips for bits plus rig service, drift surveys, etc.

●

Sweetgrass Arch— North Cut Bank Field (3,200 Ft. Pay) SA-1

Well—Carter Oil Co. 3 Barkuloo, C SE NE 18-36n-5w, Glacier County, Montana.
Contractor—Marten & Granwell Drilling Co. **Spud**—1-27-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15⅜ (9)	10¾	235	185
Long	9	7	3,168	165

DISTRIBUTION OF RIG TIME

	Days	Per cent
On bottom, normal trips, rig service, etc.	14.3	61.6
Mechanical downtime	0.8	3.4
Mix mud, condition hole	1.7	7.3
Circulate samples	0.3	1.3
Schlumberger	0.5	2.2
Drill-stem test	1.2	5.2
Casing—reaming, running, WOC	4.4	19.0
Total	23.2	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	13	3,168	238.75	13.3	24.4	18.4
			Reaming			
15⅜	1	240	12.25	19.6	240	12.3

Mud additives . . . Bentonite, 13,600 lb.; fiber, 1,200 lb.; hulls, 1,500 lb.; Tannathin, 200 lb.; caustic, 100 lb.

Drilling Comments and Discussion

Penetration to the Madison in this 3,168-ft. development well at North Cut Bank was fairly rapid and only 18 over-all days were required to total depth. Drilling was conducted during winter and although no time is directly charged to weather, the 4.2-day spread between the rotating progress and net progress curves indicated 8.4 hours were required for the average trip including rig service, drift surveys, etc., which is high for a well to 3,200 ft. Summer operations would show much improved rig efficiency.

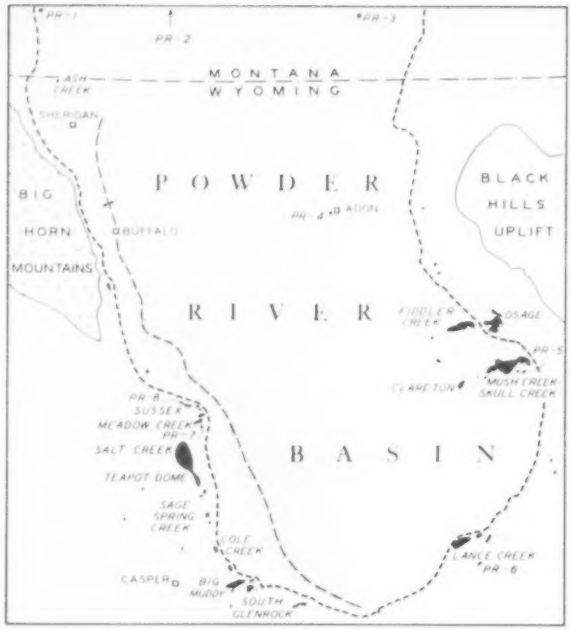
●

Powder River Basin— Marcus Snyder Field (4,500 Ft. Tensleep Pay) PR-1

Well—George J. Greer 2 Kendrick, NE NW NW 6-1s-35e, Big Horn County, Montana.
Contractor—San Juan Drilling Co. **Spud**—8-30-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	275	150
Long	8¾	7	4,556	200



DISTRIBUTION OF RIG TIME
(From Spud Through Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	18.1	64.8
Coring and reaming (including trips)	1.3	4.6
Mechanical downtime	0.5	1.8
Hole condition, mix mud	0.4	1.4
Circulate samples, wait on orders	2.1	7.5
Surveys—Schlumberger and Lane-Wells	1.3	4.6
Drill-stem test	0.6	2.1
Casing—running, WOC	3.7	13.2
Total	28.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	278	13.0	21.4	278	13.0
8¾	18.8	4,260	337.5	12.6	226	17.9
			Reaming			
8¾	0.2	50	5.3	9.4		
			Coring			
7	1	10	4.8	2.1	10	4.8
6⅛*	1	40	11.0	3.6		

*Diamond bit.

Mud additives . . . Bentonite, 40,300 lb.; caustic, 650 lb.; quebracho, 850 lb.; barium carbonate, 6,000 lb.; fiber, 25 sacks.

Drilling Comments and Discussion

This recent wildcat well in the northwestern extremity of the Powder River basin created intense industry interest in this area upon discovery of commercial oil in the Tensleep sand.

Penetration was not too difficult, requiring only 20 net days and 20 bits to total depth at 4,588 ft. Crooked-hole tendencies did not present a problem and the greatest drift was 2½° at about 1,500 ft. These tendencies were easily corrected by lowering drilling weight. No circulation losses

were experienced in this well. The spread of 5 days between rotating and net progress curves at 4,550 ft. indicates 6.3 hours per trip were required for the 19 normal trips (1 fewer for electric-log survey). This average trip time includes time spent servicing the rig, checking blowout preventers, and drift surveys.

●

Powder River Basin— Slaughter House Wildcat (7,584 Ft.) PR-2

Well—Carter Oil Co. 1 John Perry, C SE NW 23-5n-42e, Rosebud County, Montana.

Contractor—Loffland Brothers Co., Denver. **Spud**—8-5-52.

Rig description—Model 100 draw works; motors—three 350-hp. engines each; pumps—one C-350 7¼ by 18-in., and one C-250 7¼ by 15-in.; 20½-in. rotary table.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	717	340
Long	*9			

*Drilling 717 to 7,584 ft.

DISTRIBUTION OF RIG TIME (From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	28.9	61.9
Coring and reaming (including trips)	7.8	16.7
Mechanical downtime	1.2	2.6
Hole condition, mix mud	1.0	2.1
Circulate samples, wait on orders	1.7	3.6
Schlumberger	1.2	2.4
Drill-stem test	1.1	2.4
Casing—reaming, running, WOC	3.7	7.9
Completion—plug and abandon	1.1	2.4
Total	46.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	39.4	7,331	506.8	14.5	186	12.9
			Reaming			
13⅜	1	735	14.0	52.5	735	14.0
9	0.6	246	7.0	35.2		
			Coring			
8⅞	2	253	101.3	2.5		

Mud additives . . . Bentonite, 19,100 lb.; phosphate, 425 lb.; quebracho, 175 lb.; salt gel, 12,000 lb.; starch, 11,050 lb.; gypsum, 4,000 lb.; preservative, 2,050 lb.; salt, 1,000 lb.

Drilling Comments and Discussion

This wildcat in the Montana portion of the Powder River basin was drilled to a depth of 7,584 ft. as a test of the Madison formation. Penetration was fairly rapid to the first coring point at 6,303 ft., only 17.8 net days being required. In the over-all drilling of the well, 78.6 per cent of the time was spent in normal operations of coring and drilling. This well has shown faster penetration rates than Carter Oil Co. 1 Max Schenk, or Carter I.N.P.R.R.

To 5,000 ft., subject well required 9 net days and 10 bits as compared to 12 to 13 net days and 14 bits in the other two wells. None of the wells in this area had any crooked-hole problems and no lost-circulation or hole problems. All the wells were drilled with gypsum-base mud.

Powder River Basin— Mizpah Wildcat (8,991 Ft.) PR-3

Well—Stanolind Oil & Gas Co. 1 Northern Pacific, SE SW NW 27-2s-50e, Powder River County, Montana.

Contractor—Noble Drilling Corp., Tulsa. **Spud**—4-7-45.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½	13⅜	371	310
Protection	12¼	9⅝	3,574	200
Long	*9-‡8¾			

*Drilling from 3,574 to 4,150 ft. ‡Drilling from 4,150 to 8,991 ft.

DISTRIBUTION OF RIG TIME (From Spud Date to Abandonment)

	Days	Per cent
On bottom, normal trips, rig service, etc.	80.7	66.8
Coring and reaming (including trips)	7.2	5.7
Mechanical downtime	2.3	1.8
Mix mud, condition hole	1.8	1.4
Circulate samples	1.0	0.8
Schlumberger	2.3	2.0
Drill-stem test	4.0	3.2
Stuck pipe, fishing	8.6	6.8
Casing—reaming, running, WOC	11.6	9.1
Completion—pull casing, plug, and abandon	3.0	2.4
Total	122.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	11	4,154	314.0	13.2	378	28.5
8¾	48	4,837	1,272.5	3.8	101	26.5
			Reaming			
17½	1	374	14.5	25.8	374	14.5
12¼	2	3,850	43.8	8.2	1,790	21.9
			Coring			
*8¾-7⅝	6	210	67.5	3.1	35	11.2
8¾-8½-7⅝	3	54	28.3	1.9	18	9.4

*Wire line.

Mud additives . . . Bentonite, 42,800 lb.; caustic, 1,140 lb.; quebracho, 3,650 lb.; Anhydrox, 37,800 lb.

Drilling Comments and Discussion

This wildcat well drilled in the Montana portion of the Powder River basin was drilled to a depth of 8,991 ft. in the Ordovician. Closest well analyzed is Carter Oil Co. 1 Max Schenk, at Forsyth approximately 70 miles northwest of this location. Penetration correlations between the two wells to the Tensleep formation are shown as follows:

SURFACE TO TENSLEEP

	Well A*	Well B‡
Interval	6,120	6,980
Net days	23	49
Rotating days	19.7	39.5
Number bits	27	32
Feet per net day	266	142
Feet per rotating day	310	177
Feet per bit	227	218

*Carter Oil Co. 1 Max Schenk, Forsyth wildcat, Rosebud County, Montana. ‡Stanolind Oil & Gas Co. 1 Northern Pacific, Mizpah wildcat, Powder River County, Montana.

The 18-day spread at total depth between rotating and net progress curves analyzed in subject well indicates an average of 7.6 hours per trip consumed for bits. This includes time spent for rig service and straight-hole surveys.

Pushing Tools—Powder River Basin

Powder River Basin— Gillette Area Wildcat (10,938 Ft.) PR-4

Well—Gulf Oil Corp. 1 C. H. Davis, C SW SW 34-51n-72w, Campbell County, Wyoming.

Contractor—Miracle & Wooster Drilling Co. **Spud**—7-11-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½ (12¼)	13⅜	739	415
Long	*9-16⅛			

*Drilling 739 to 10,750 ft. †Diamond coring 10,750 to 10,938 ft.

DISTRIBUTION OF RIG TIME (From Spud Date to Total Depht)

	Days	Per cent
On bottom, normal trips, rig service, etc.	66.3	51.3
Coring, reaming (including trips)	44.5	33.6
Mechanical downtime	3.5	2.4
Mix mud, lost circulation, condition hole	7.2	5.1
Circulate samples, wait on orders	0.3	0.1
Drill-stem test	3.0	2.1
Surveys—Schlumberger, Velocity, etc.	3.5	2.5
Fishing	0.7	0.4
Casing—reaming, running, WOC	3.0	2.5
Total	132.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	1	751	23.7	31.6	751	23.7
9	64	9,307	1,090.9	8.5	145	17.1
8⅞*	1	111	86.0	1.3	111	86.0
			Reaming			
17½	1	739	13.0	30.8	739	13.0
9	9	386	112.0	3.5	43	12.5
			Coring			
6⅛*	4	575	390.2	1.5		
8⅞*	2	187	185.2	1.0		

*Diamond bit.

Mud additives . . . Bentonite, 182,700 lb.; barium carbonate, 42,700 lb.; Zeogel, 30,480 lb.; starch, 25,200 lb.; gypsum, 8,200 lb.; Tannex, 2,550 lb.; caustic, 1,580 lb.; quebracho, 1,225 lb.; preservative, 2,950 lb.; Driscose, 350 lb.; fiber, 314 sacks; cellophane, 197 sacks; mica, 17 sacks, fiber glass, 10 sacks.

Drilling Comments and Discussion

This 10,938-ft. test of Madison formation in the central part of the Powder River basin is located about 15 miles south of the 1 Texas Co. 4 Adon Unit previously analyzed.

Penetration rates are similar in the two wells to 7,200 ft. except that the decided slowing of rate below the Dakota in the Adon well is not reflected in subject well. One diamond-drill bit was run which cut 118 ft. of hole from 10,095 to 10,213 ft. at an average rate of 1.4 ft. per hour.

Diamond coring was slow also. For the 575 ft. of 6⅛-in. hole cored, average rate was 1.5 ft. per hour. The 8⅞-in. diamond bits cored 187 ft. at an average rate of 1.0 ft. per hour. No circulation losses were encountered after setting the surface pipe. Crooked-hole difficulties were not apparent and maximum deviation was 2°.

Drilling weights below 6,000 ft. averaged 10 tons. A caustic-quebracho mud was used from 7,600 ft. to the top of the Opeche at about 9,700 ft. From this depth to total depth, gypsum-base mud was used.

Powder River Basin— South Clareton Field (6,700 Ft. Pay) PR-5

Well—Big Horn—Powder River Corp., and J. D. Sprecher 2 Mary Wakeman, NE NE NW 1-42n-66w, Weston County, Wyoming.

Contractor—Progressive Drilling Co. **Spud**—1-24-53.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	265	125
Long	9	5½	6,708	150

DISTRIBUTION OF RIG TIME (From Spud Date to Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	13.9	64.9
Coring and reaming (including trips)	1.6	7.5
Mechanical downtime	1.2	5.6
Lost circulation, hole condition, mix mud	0.9	4.2
Surveys—Schlumberger	1.0	4.7
Weather	0.6	2.8
Casing—reaming, running, WOC	2.2	10.3
Total	21.4	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	265	8.0	33.2	265	8.0
9	15.1	6,382	205.8	31.0	422	13.6
			Reaming			
9	0.9	63	1.5	42.0	70	1.7
			Coring			
6⅛	1.0	63	26.2	2.4		

Mud additives . . . Bentonite, 6,300 lb.; Driscose, 600 lb.; Fibertex, 2 sacks; sawdust, 2 sacks.

Drilling Comments and Discussion

Due to the increased interest in the Clareton area, this well was analyzed to illustrate drilling characteristics in Southwest Clareton extension. Drilled to a total depth of 6,710 ft. in the Cretaceous Newcastle formation, this well exhibited a penetration rate almost identical with the Continental Oil Co. 1 Irish well, which is about 1½ miles to the northeast.

To 6,000 ft., 11½ over-all days, 9½ net days, and 13 rock bits were required, as compared to 11½ over-all days, 9 net days, and 11 rock bits for the Irish well. Some circulation losses were experienced at about 5,400 ft., but caused no serious loss in time. As in the Irish well, deviation was negligible, the maximum being only 1°.

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Powder River Basin— South East Lance Creek Wildcat (6,300 Ft.) PR-6

Well—Continental Oil Co. 1 Martin and Lavin, NW NE NE 26-35n-64w, Niobrara County, Wyoming.

Contractor—R. L. Manning Co., Denver. **Spud**—10-29-51.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	209	200
Long	*9			

*Drilling 209-6,300 ft.

Pushing Tools—Powder River Basin

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	39.7	44.5
Coring and reaming (including trips)	30.2	34.0
Mechanical downtime	0.8	0.9
Mix mud, lost circulation, hole condition	6.3	7.1
Circulate samples, wait on orders	1.6	1.8
Drill-stem test	4.4	4.9
Schlumberger	1.6	1.8
Casing—running, WOC	3.7	4.1
Completion—plug and abandon	0.8	0.9
Total	89.1	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
15	1	212	8.5	25.0	212	8.5
9	48.6	5,721	708.0	8.1	117	14.6
			Reaming			
9	11.4	367	84.0	4.4	32	7.4
			Coring			
6⅛*	4	367	315.0	1.2		
		(One 9-in. bit hole condition)				

*Diamond bits.

Mud additives . . . Bentonite, 108,600 lb.; caustic, 4,160 lb.; quebracho, 7,500 lb.; Driscose, 3,444 lb.; soda ash, 6,330 lb.; Palco Seal, 2 bales; sawdust, 1,825 lb.; King Seal, 24 sacks; crude oil, 50 bbl.

Drilling Comments and Discussion

This wildcat in the southeastern portion of the Powder River basin and in the important Lance Creek vicinity showed typically rapid progress to the Dakota sand series and a marked lowering in penetration rate after reaching the Dakota series.

A considerable amount of coring and reaming time resulted in a wide spread between rotating and net progress curves. This well resembles the drilling characteristics of several wells drilled to the granite in the northwestern portion of the Denver-Julesburg basin 40 miles to the southeast.

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Powder River Basin— Meadow Creek—Tensleep Discovery (9,000 Ft. Pay) PR-7

Well—Continental Oil Co. 98 Meadow Creek Unit, SE NE NW 11-41n-78w, Johnson County, Wyoming.

Contractor—Signal Drilling Co., Tulsa. **Spud**—11-14-51.

Rig description—Model 80 draw works mounted on a 133-ft. mast with a 11-ft. high substructure; motors—three Model PCS 2505 gas-butane, 900-hp. supercharged engines.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	273	225
Protection	9	7	9,097	1,200
Long	*6-†5⅞			

*Drilling, 9,097-10,447 ft. †Diamond coring, 10,447-10,724 ft.

Drilling Comments and Discussion

This Tensleep discovery in Meadow Creek field was first carried to the Cambrian rocks. Drilling progress to the Tensleep at 8,290 ft. was unusually rapid, requiring only 32 net days, 40 total days, and only fifty-three 9-in. rock bits. Native mud was used to 6,300 ft.

Penetration of the Frontier-Embar interval was unusually rapid for this depth. Interval below the Tensleep into the Cambrian was continuously diamond cored. Overall time of 126.7 days to drill a well to total depth of 10,724 ft., plug back to 9,050 ft. and place the well on production, is considered exceptionally rapid for the Rocky Mountain area.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	38.7	30.6
Coring and reaming (including trips)	52.4	41.3
Mechanical downtime	3.3	2.6
Mix mud, lost circulation, hole condition	2.0	1.6
Circulate samples, wait on orders	0.9	0.7
Schlumberger	0.6	0.5
Drill-stem test	5.3	4.2
Fishing, stuck pipe	4.2	3.3
Weather	1.4	1.1
Casing—reaming, running, WOC	8.4	6.6
Completion—plug back, perforate, flow	9.5	7.5
Total	126.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	56.2	9,004	530.5	17.0	160	9.5
6⅛	1	3	1.8	1.6	3	1.8
			Reaming			
15	1	275	8.8	31.3	275	8.8
9	4.8	105	23.8	4.4	21	5.0
			Coring			
6⅛*	1	105	32.5	3.2		
6*	8	1,330	555.3	2.4		
5⅞*	2	282	133.5	2.1		

*Diamond bits.

Mud additives . . . Bentonite, 78,100 lb.; caustic, 2,430 lb.; quebracho, 5,100 lb.; soda ash, 3,990 lb.; Driscose, 1,450 lb.; hulls, 25 sacks; Fibertex, 8 sacks; Jel Flake, 5 sacks.

●

Powder River Basin— Sussex Tensleep Pool (9,000 Ft. Pay) PR-8

Well—Continental Oil Co. 78 Sussex Unit A, SW NW SW 17-42n-78w, Johnson County, Wyoming.

Contractor—Signal Drilling Co., Tulsa. **Spud**—8-26-51.

Rig description—Model 80 draw works mounted on a 133-ft. mast with an 11-ft. high substructure; motors—three Model PCS 2505 gas-butane, 900-hp. supercharged engines.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	238	200
Long	*9	7	8,995	400

*Drilling 238-9,208 ft.

Drilling Comments and Discussion

This Sussex Tensleep pool well in the west edge of the Powder River basin was analyzed because of increasing industry interest in Tensleep production. Bore hole was permitted to deviate 7° from vertical at 7,600 ft. However, the hole was relatively straight to 5,000 ft.

Pushing Tools—Big Horn Basin

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release Date)

	Days	Per cent
On bottom, normal trips, rig service, etc.	43.9	59.0
Coring and reaming (including trips)	9.5	12.8
Mechanical downtime	2.0	2.7
Mix mud, condition hole	3.8	5.1
Schlumberger survey	0.9	1.2
Drill-stem tests	2.1	2.8
Circulate for samples	0.3	0.4
Drilling cones	1.3	1.7
Casing—running, WOC	5.5	7.4
Completion—testing	5.1	6.9
Total	74.4	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
15	1	245	10.8	22.7	245	10.8
9	66	8,792	642.8	13.7	133	9.8
			Reaming			
9	10	171	42.8	4.0	17.1	4.3
			Coring			
5⅞*	3	171	76.5	2.2		

*Diamond bit.

Drilling progress was rapid to the Frontier series at about 6,300 ft. and only 9.5 net days were required. The following table compares the Frontier-Phosphoria interval in this well with other wells in the Big Horn basin:

FRONTIER TO PHOSPHORIA

	Gebo	Sussex	Slick Creek
Interval analyzed	3,300	2,400	3,200
Mean depth of interval	2,900	7,500	8,800
Feet per net day	254	89	69
Drilling wt., thousands of tons	10-12	15-20	15-18
Table speed, r.p.m.	100	70-80	70-100
Mud properties:			
Weight, lb. per gal.	(*)	19.7-10	9.6-9.9
Viscosity, sec. A.P.I.	(*)	50-70	50-70
Water loss, cc.	(*)	3-5	3-7

*Water or native mud used. †Partly native mud.

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Big Horn Basin— BH-1
Madison Development Well (5,800 Ft. Pay)

Well—Stanolind Oil & Gas Co. 131-M Elk Basin Unit, SW SW NW 35-9s-23e, Carbon County, Montana.

Contractor—Fred M. Manning Co., Denver. **Spud**—3-2-48.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	350	150
Long	*9-6¼	7	4,900	200

*4,950-5,797 ft.

Drilling Comments and Discussion

These Elk basin Madison pool development wells were analyzed to compare 6⅛-in. diamond coring in Madison limestone to drilling of the same section with 6¼-in. rock bits. It is indicated that about 18 net days were required to core 845 ft. of Madison section from 5,192 ft. to total depth at 6,037 ft. in Stanolind Oil & Gas Co. 133-M Elk Basin Unit. To drill 845 ft. of Madison in Stanolind 131-M Elk Basin Unit, from 4,952 ft. to total depth at 5,797 ft., 13.5 net days were required. Crooked-hole tendencies presented a serious problem in both of these wells and a formerly analyzed Elk Basin Tensleep well, Carter Oil Co. 11 Johnson-Watson. Exceptionally light drilling weights were used throughout subject well.

It is of interest that in drilling to 5,000 ft. in 133-M Elk Basin Unit, 51.5 bits and 43 net days were required. However, in 131-M Elk Basin Unit drilled to the same depth, 71.5 bits and 55 net days were required. Heavier drilling weights were carried in 131-M Elk Basin Unit.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	63.8	78.2
Coring and reaming (including trips)	5.3	6.5
Mechanical downtime	2.0	2.4
Mix mud, lost circulation, hole condition	1.2	1.5
Circulate samples	0.1	0.1
Surveys—Lane-Wells, Gamma Ray, Neutron	0.7	0.9
Fishing	1.0	1.2
Weather	0.1	0.1
Casing—reaming, running, WOC	5.5	6.7
Completion—tubing, swabbing, flow and test	2.0	2.4
Total	81.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	66.2	4,873	982.5	4.9	73.7	14.8
8¾	1	2	1.3	1.6		
6¼	15	867	263.0	3.3	57.8	17.5
			Reamieg			
13¾	1	369	17.0	21.7	369	17
9	1.8	59	15.2			
			Coring			
8¾*	1	19	25.5	0.7		
6⅛*	1	36	31.0	1.2		

*Diamond bits.

Mud additives . . . Bentonite, 60,700 lb.; quebracho, 700 lb.; caustic, 300 lb.; Baroid, 18,900 lb.; anhydrox, 27,500 lb.; Smentox, 1,300 lb.

Big Horn Basin— Five Mile Discovery (11,740 Ft. Pay) BH-2

Well—Husky Refining Co., and Wilshire Oil Co. 1 Torgeson, C NE NE 29-49n-93w, Big Horn County, Wyoming.

Contractor—Mountain States Drilling Co., Inc., Denver. **Spud**—7-13-51.

Rig description—Model 125 draw works mounted on a 156-ft. derrick; motors—three Model 2505 diesel engines; pumps—two C-350, 7¼ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½	13⅜	316	300
Protection	12¼ (9)	9⅝	4,027	850
Long	*8⅝-6	7	11,933	650

*Coring 11,933-12,283 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	123.3	56.5
Coring and reaming (including trips)	32.3	14.8
Mechanical downtime	5.2	2.4
Mix mud, lost circulation, condition hole	6.2	2.8
Circulate samples, wait on orders, weather	1.4	0.6
Surveys—Schlumberger and Lane-Wells	3.3	1.5
Drill-stem test	7.4	3.4
Stuck pipe, drilling on junk	4.0	1.8
Casing—reaming, running, WOC	12.0	5.5
Completion—plugback, perforate, acidize, test	23.3	10.7
Total	218.4	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	3	1,646	51.0	32.2	549	17.0
9	11	2,246	123.5	18.2	205	11.2
8⅝	119.8	7,345	1,904.0	3.9	61	15.9
			Reaming			
17½	1	314	3.3	95	314	3.3
12¼	4	2,276	55.5	41	570	13.6
8⅝	3.2	102	24.3	4.2	32	7.6
			Coring			
8½*		473	184.3	2.6		
6⅛*		102	61.5	1.7		
6*		343	205.0	1.7		

Eight 8⅝-in. drilling junk and conditioning hole.
Four 6-in. conditioning and drilling retainers.

*Diamond bits.

Mud additives . . . Bentonite, 36,300 lb.; barite, 95,400 lb.; quebracho, 9,515 lb.; Driscose, 6,475 lb.; Kembreak, 12,750 lb.; lime, 46,775 lb.; starch, 49,775 lb.; sodium bicarbonate, 25 sacks; control fiber, 375 sacks; Seal Flake, 78 sacks; Silvacel, 60 sacks; hulls, 7 sacks; Strata Seal, 3 sacks.

Drilling Comments and Discussion

This Five Mile wildcat reflects the trend toward exploration to deeper depths in various basins. This analysis further illustrates the effect of depth upon the penetration characteristics of given formations.

Frontier-Phosphoria interval required 70 bits and 70 net days. Comparison of penetration characteristics of this geological interval in this well with the same interval encountered at shallower depths in other wells is given in the following table:

Pool—	Frontier-Phosphoria interval	Mean depth	Ft./net day	Drlg. wt., tons	Table speed (r.p.m.)	—Mud properties— W.L.	Vis.	Wt.
Gebo	3,300	2,900	254	10-12	100	Water or native		
Glenrock	2,720	7,000	153	10-12	90	6-11	40-70	9.7-10
Meadow Creek	2,550	7,400	142	18-20	90	5-8	38-65	9.4-9.8
Sussex	2,400	7,500	89	15-20	70-80	3-5	50-70	*9.6-9.9
Slick Creek	3,200	8,800	69	15-18	70-110	3-7	50-60	9.6-9.9
Five mile	2,720	10,240	39	12-5	60-110	3-7	48-90	9.5-10

*Partly native mud.

Wells included in the table were not affected by crooked-hole tendencies.

An outstanding problem was the tendency of the formations to slough and cave. This created a mud-control problem in that a mud with characteristics to minimize this caving condition adversely affected penetration rates. A 4,000-ft. intermediate casing string was run because of hole condition.

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Big Horn Basin— Bonanza Field (2,550 Ft. Pay) BH-3

Well—Stanolind Oil & Gas Co. 11 McIntosh-Berwick, SE NW SE 26-49n-91w, Big Horn County, Wyoming.

Contractor—Carpenter-Trant Drilling Co., Denver. **Spud**—3-30-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	12¼	9⅝	220	110
Long	8¾	7	2,839	150

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	13.8	64.2
Mechanical downtime	2.3	10.7
Lost circulation, mix mud, hole condition	1.2	5.6
Schlumberger	0.2	0.9
Casing—reaming, running, WOC	3.3	15.3
Completion—perforate, flow and test	0.7	3.3
Total	21.5	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
12¼	1	222	19.3	11.5	222	19.3
8¾	15	2,618	258.5	10.1	174	17.2

Mud additives . . . Bentonite, 51,200 lb.; Kembreak, 1,925 lb.; lime, 1,650 lb.; starch, 1,100 lb.; Driscose, 200 lb.; fiber, 54 sacks; sawdust, 17 sacks.

Drilling Comments and Discussion

Crooked-hole conditions were a major problem in the Bonanza field development well after a depth of 400 ft. was reached. This is typical of drilling conditions on relatively small structures with steep dips.

Spread of 2 days between rotating progress and net progress curves at 2,840 ft. indicates that an average trip required 3 hours to this depth (including drift surveys, rig service, etc.). Only 0.7 day was required to complete the well by perforating and displacing drilling fluid with oil.

Pushing Tools—Big Horn Basin

Big Horn Basin— Slick Creek Field (10,500 Ft. Pay) BH-4

Well—General Petroleum Corp. 44-35-G General Petroleum, SE SE NW 35-47n-92w, Washakie County, Wyoming.

Contractor—R. L. Manning Co., Inc., Denver. **Spud**—8-4-51.

Rig description—Model S-1000 draw works mounted on a 136-ft. derrick with a 30-ft. base, 10-ft.-high substructure; motors—three six-cylinder 435-hp. LRZ; pumps—one FXL 8 by 20-in. and one FXQ 7¾ by 16-in.; 27½-in. rotary table.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17¼	13⅜	542	360
Long	*9⅝-6⅛	7	10,450	450

*10,450-10,577 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, service rig, etc.	61.4	75.2
Coring and reaming (including trips)	5.0	6.1
Mechanical downtime	1.1	1.3
Mix mud, condition hole	1.1	1.3
Schlumberger	0.8	1.0
Fishing and stuck pipe	1.2	1.5
Casing—reaming, running, WOC	6.4	7.8
Completion—run tubing, swab, flow and test	4.7	5.8
Total	81.7	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
17½	1	156	4.3	36.3	156	4.3
9⅝	100	10,279	954.8	10.8	102.8	9.5
			Reaming			
17½	1	382	8.5	45.0	382	8.5
			Coring			
6⅛*	1	142	60.3	2.4		

*Diamond bits.

Drilling Comments and Discussion

High rig efficiency was observed in this 10,577-ft. Slick Creek oil field well in the south-central portion of the Big Horn Basin basin, and 81 per cent of total time (from spud to rig release date was spent in normal drilling and coring operations including completion time).

Water or natural mud was used to about 5,800 ft. with no apparent slowing in penetration rate after changing to low-water-loss mud until the weight was decreased at 6,250 ft. because of hole deviation. A comparatively high rotary table speed of 175 r.p.m. was used to 7,600 ft. with a drilling weight of 20 tons.

Section below the Frontier formation drilled much more difficult at Slick Creek at a depth of 8,800 ft. than at Gebo further south in the basin at a depth of 2,900 ft. A comparison of two wells drilled in these areas by the same contractor shows that 3,300 ft. of section between Frontier and Phosphoria formations at Gebo required 13 net days as opposed to 46.5 days for 3,200 ft. for the same geological section at Slick Creek.

Big Horn Basin— Neiber Dome Field (10,000 Ft. Pay) BH-5

Well—California Co. 3 Unit, NE SW SE 14-45n-93w, Washakie County, Wyoming.

Contractor—Loffland Brothers Co., Denver. **Spud**—10-23-52.

Rig description—Model 100 draw works mounted on a 136-ft. derrick with a 30 by 30-ft. 8-ft.-high substructure base; motors—three Model 6G510; pumps—one Model C-350 7¼ by 18-in. and one Model C-250 7¼ by 15-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½ (12¼)	13⅜	1,499	1,250
Long	*9-†8⅝	7	10,298	250

*1,499-10,198 ft. †10,198-10,298 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	70.7	60.0
Coring and reaming (including trips)	19.4	16.4
Mechanical downtime	1.2	1.0
Hole condition, lost circulation, mix mud	3.1	2.6
Circulate samples, WOO	3.3	2.8
Surveys—Schlumberger, velocity survey	3.6	3.1
Drill-stem test	9.6	8.1
Casing—reaming, running, WOC	7.1	6.0
Total	118.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	3	1,530	43.7	35.0	310.0	14.6
9	92.9	7,668	931.7	7.7	76.7	10.0
8⅞*	1	598	193.2	3.1	598.0	193.2
	(6¼-in. bit used to wash hole)					
			Reaming			
17½	3	1,500	32.2	46.6	500	10.1
9	6.1	352	54.3	6.5	57.1	8.9
			Coring			
6⅛*	3	352	150.7	2.3		
8⅝*	2	56	29.0	1.9		
8⅞*	1	94	31.7	3.0		

*Diamond bits.

Mud additives . . . Bentonite, 198,600 lb.; starch, 41,100 lb.; lime, 32,900 lb.; Kembreak, 6,925 lb.; caustic, 4,580 lb.; quebracho, 2,185 lb.; soda bicarbonate, 1,700 lb.; oil, 1,135 lb.; fiber, 121 sacks; cellophane, 105 sacks; Super Bridge, 100 sacks; Starter Seal, 40 sacks; Tuff Plug, 25 sacks.

Drilling Comments and Discussion

This recently completed Neiber dome well in the southern part of the Big Horn basin was analyzed to indicate recent drilling progress in this field. A previously analyzed well, California Co. 1 Poe-Government, indicated much slower progress than this well. To total depth at 10,298 ft., 81 net days would have been required had no coring been performed. It is estimated that 115 net days would have been required to total depth at 10,429 ft. on the other Neiber dome well analyzed.

Bit requirements to 9,500 ft. were comparable in the two wells; at this depth diamond drill bits and core heads were used in this well to total depth.

An interval of 598 ft. immediately above the Dinwoody was diamond drilled with an average penetration rate of 3.1 ft. per hour. For the comparable interval in the California Co. 1 Poe-Government well, 20 rock bits were used for an average penetration rate of 2.2 ft. per

hour. With the faster penetration rate and the saving of trip time, it is estimated that about 9 days were saved by using diamond drill bits. Both wells experienced some circulation losses.

●

Big Horn Basin— Gebo Dome (5,000 Ft. Pay) BH-6

Well—Continental Oil Co. 33 Gebo Unit, 23-44n-95w, Hot Springs County, Wyoming.

Contractor—Pioneer Drilling Co., Casper, Wyo. **Spud**—7-30-51.

Rig description—Model 6A-500 draw works mounted on a 126-ft. mast; pumps—C-150 7¼ by 14 in.; 17½-in. rotary table; 4½-in. drill pipe; three 450-bbl. mud tanks; 10-kw. light plant.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾ (9)	10¾	174	100
Long	9	5½	4,890	200

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release Date)

	Days	Per cent
On bottom, normal trips, service rig, etc.	38.2	66.3
Mix and condition mud	0.8	1.4
Mechanical downtime	4.4	7.6
Drill-stem test and Schlumberger	0.5	0.9
Casing—Reaming, running, WOC	5.3	9.2
Completion—Run tubing, shoot, cleanout, swab	8.4	14.6
Total	57.6	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	45	5,141	670.75	7.7	114.2	14.9
			Reaming			
13¾	1	175	7.25	24.1		

Drilling Comments and Discussion

This Gebo Unit well was selected to compare drilling characteristics with an offset well, 32 Gebo Unit. Considering first the upper 3,000 ft. penetrated, 32 Unit required only 5½ net days as compared to 12¼ days for 33 Unit. Slower time at 33 Unit is attributable to crooked-hole tendency, whereas 32 Unit was unusually straight.

Structurally, both wells are similar with comparable formation dips. Both wells were drilled with water or native mud for this portion of the hole. Possible explanation for the straight hole at 32 Unit may be: (1) faster rotary speeds at 32 Unit, 100-150 r.p.m., as opposed to 70-100 r.p.m. at 33 Unit, and (2) the use of eight drill collars in the first part of the hole at 32 Unit as opposed to three drill collars at 33 Unit. Crooked-hole tendency observed in 33 Unit may have been attributable to the surface hole being started crooked. Well bore deviated 1¼° within the first 150 ft.

Between 3,000 ft. and 4,400 ft. 32 Unit required 8¾ days as compared with 12¾ days at 33 Unit. Faster penetration rates at 32 Unit may be partially attributable to (1) drilling with water as opposed to a low-water-loss mud at 33 Unit, and (2) faster rotary speeds (100 r.p.m. at 32 Unit vs. 60-80 r.p.m. at 33 Unit). Lesser drilling weights were employed throughout this zone at 33 Unit due to crooked-hole tendency.

Big Horn Basin— Walker Dome Discovery (7,000 Ft. Pay) BH-7

Well—Forest Oil Corp. 1 Mill Iron Land & Cattle Co., SE SE NE 8-46n-99w, Hot Springs County, Wyoming.

Contractor—R. L. Manning Co., Denver. **Spud**—12-8-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	389	200
Long	9	5½	6,956	300

PENETRATION RATES AND BITS
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	45.5	44.1
Coring and reaming (including trips)	27.3	26.5
Mechanical downtime	3.2	3.1
Hole condition, lost circulation, mix mud	4.5	4.4
Circulate samples, wait on orders	1.0	1.0
Schlumberger	0.9	0.9
Drill-stem test	5.7	5.5
Fishing	0.8	0.8
Rig up after spud	0.6	0.6
Casing—Reaming, running, WOC	5.5	5.3
Completion—Perforate, acidize, swab	8.0	7.8
Totals	103.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	391	5.5	71.1	391	5.5
9	52.8	5,813	829.0	7.0	110	15.7
			Reaming			
9	8.2	760	93.2	8.2	9.3	8.1
			Coring			
6⅛*	2	278	62.0	4.5		
7¾*	1	482	216.2	2.2		

*Diamond bits.

Mud additives . . . Bentonite, 78,000 lb.; barium carbonate, 27,600 lb.; quebracho, 3,825 lb.; caustic, 3,160 lb.; Driscose, 1,400 lb.; sawdust, 146 sacks; hulls, 5 sacks; control flakes, 5 sacks.

Drilling Comments and Discussion

This recent Embar discovery in the southwest side of the Big Horn basin was analyzed in anticipation of additional drilling in this area. The well is about 4 miles southeast of General Petroleum Co., 3-33-Government well previously analyzed.

Rock-bit penetration in the two wells was similar, with penetration rate in both wells averaging 7 ft. per hour while drilling with 9-in. bits. The General Petroleum 3-33-Government well, however, averaged more footage per 9-in. bit than this well, being 131 and 110 ft. per bit, respectively. Some crooked-hole tendencies were experienced in both wells. Subject well reached a maximum deviation of 5° at 4,000 ft., and drilling weights were usually held below 10 tons. Circulation losses were also experienced at 3,000 ft. and again in the red beds below 6,000 ft.

●

Wind River Basin— Winkleman Dome field (3,100 Ft. Pay) WR-1

Well—Stanolind Oil & Gas Co. 15-E A Shoshone-Arapahoe-Tribal, NW NE 19-2n-1w, W.R.M., Fremont County, Wyoming.

Pushing Tools—Wind River Basin

Contractor—R. L. Manning Co., Denver. **Spud**—4-5-53.

Rig description—Model PD36 draw works mounted on a 96-ft. mast with an 18-ft. base and 9-ft.-high substructure. Motors—two R-61 engines; pumps—one FZ 6¾ by 14-in. on draw works; and one FZ 5 by 14-in. on independent motor drive.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	226	150
Long	*8¾-†6⅛	7	2,809	450

*Drilling 226-2,809 ft. †Coring 2,809-3,145 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	12.7	59.6
Mechanical downtime	0.1	0.5
Hole condition, mix mud	0.2	0.9
Schlumberger	0.2	0.9
Weather	0.2	0.9
Rig up after spud	0.8	3.8
Fishing	0.5	2.3
Casing—reaming, running, WOC	3.9	18.4
Completion	2.7	12.7
Total	21.3	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	0.6	87	11.7	7.4	145	19.5
8¾	15	2,723	163.8	16.6	181	10.9
6⅛	9	335	72.2	4.6	37	8.0
			Reaming			
13¾	0.4	141	8.0	17.6	352	20.0

Mud additives . . . Bentonite 6,300 lb.; Kembreak, 400 lb.; caustic, 200 lb.; lime, 100 lb.; hulls, 10 sacks.

Drilling Comments and Discussion

The most significant feature about Winkleman dome drilling operations is the extreme difficulty of controlling crooked holes. On the drift curve, a maximum deviation of 5° was logged at 2,100 ft., averaging 4° throughout.

Despite crooked-hole tendencies, penetration rate was fairly rapid; only 10 rotating days, 13 net days, 17 overall days, and 25 rock bits were required to reach total depth of 3,145 ft.

●

Wind River Basin— Beaver Creek Field (11,000 Ft. Pay) WR-2

Well—Stanolind Oil & Gas Co. 22 Tensleep Unit, NW NW NW 14-33n-96w, Fremont County, Wyoming.
Contractor—Noble Drilling Corp., Tulsa. **Spud**—1-16-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	12¼	9⅝	2,902	1,350
Long	8¾-*5⅞	7	10,838	1,510

*Diamond coring 10,838-11,299 ft.

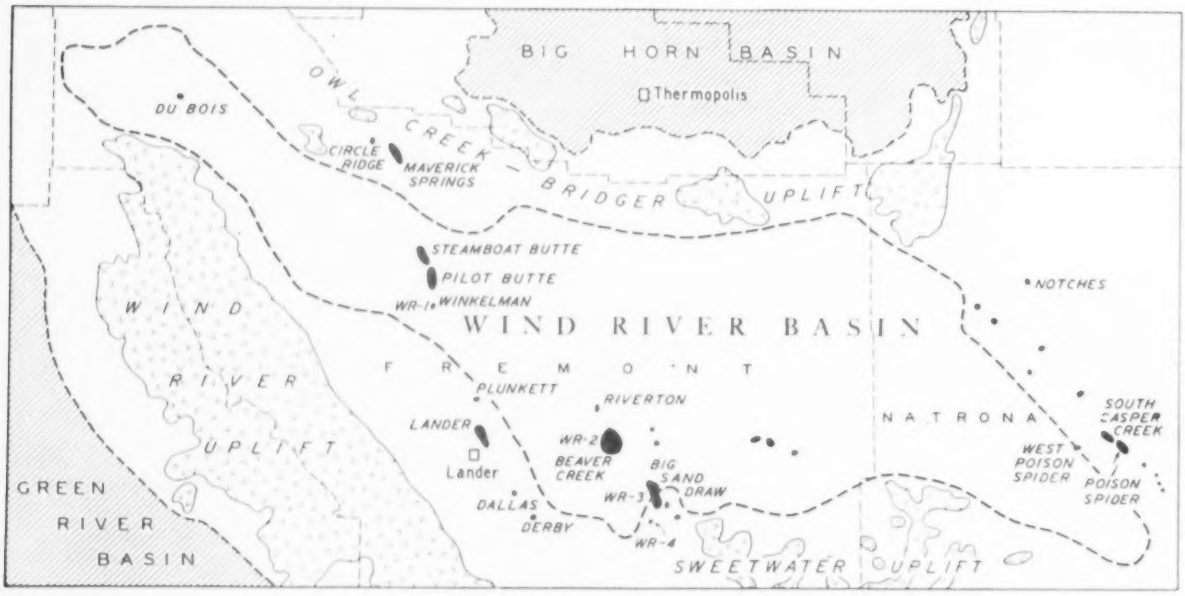
DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Tear Down)

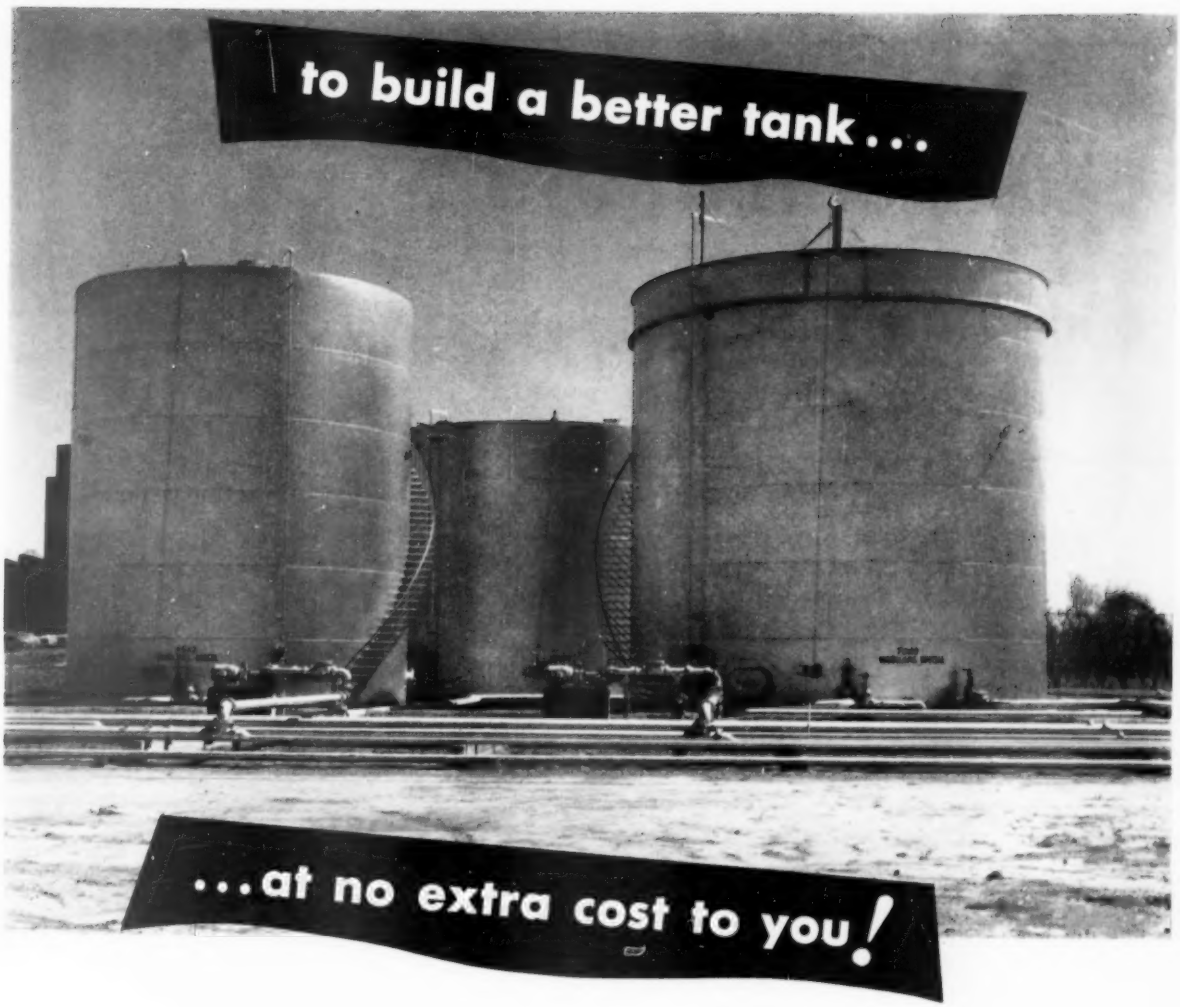
	Days	Per cent
On bottom, normal trips, rig service, etc.	64.8	48.6
Core and reaming (including trips)	38.8	29.2
Mechanical downtime	5.2	3.4
Mix mud, lost circulation, hole condition	4.3	3.2
Schlumberger and Lane-Wells	2.2	1.7
Drill-stem test	3.3	2.5
Fishing	3.9	2.9
Weather	0.1	0.1
Casing—reaming, running, WOC	7.5	5.6
Completion	3.0	2.8
Total	133.1	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	6	2,907	82.75	35.2	484.5	13.7
8¾	86.1	7,472	997.25	7.5	86.7	11.6
5⅞	1		22.00		Condition hole	
			Reaming			
8¾	10.9	432	73.25	5.9	39.6	6.8
8⅝*	1	73	38.50	1.9	73	38.5
			Coring			
5⅞*	11	920	373.00	2.5	83.7	33.9

*Diamond bits.





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Pushing Tools—Wind River Basin

Mud additives . . . Bentonite, 118,400 lb.; barite, 247,200 lb.; caustic, 5,410 lb.; Tannathin, 6,650 lb.; barium carbonate, 33,245 lb.; quebracho, 6,950 lb.; Seal Flakes, 27 sacks; Mica Seal, 15 sacks; Black Magic, 1,025 lb.; Black Water, 5,600 lb.; Controlbar, 15,800 lb.; oil, 120 bbl.; chemical "V," 5¼ bbl.; diesel fuel, 100 bbl.; O.B. gel, 33,800 lb.

Drilling Comments and Discussion

This Tensleep well in Beaver Creek field is the deepest Wind River basin well analyzed to date. Drilled to a depth of 11,299 ft., 133 over-all days, 103.5 net days, and 59.5 rotating days were required.

Crooked-hole trouble was experienced after reaching a depth of 4,000 ft., with a maximum deviation of 5° at 10,000 ft. A total of 920 ft. of 5⅞-in. diamond cores were cut in this well. Reaming in the Permian Phosphoria limestone was especially difficult and to speed up this operation an 8⅝-in.-diameter head was used. Oil-base mud was used in the completion to prevent contamination of the producing formation.

●

Wind River Basin— Sand Draw Field (7,000 Ft. Pay) WR-3

Well—Sinclair Oil & Gas Co. 13 Unit, SW NE NW 10-32n-95w, Fremont County, Wyoming.

Contractor—Peak Drilling Co., Inc., Casper, Wyo. **Spud**—8-12-50.

Rig description—Model 100 draw works mounted on 136-ft. mast with a 7-ft.-high substructure; motors—three six-cylinder LRO diesel engines; pumps—two C-250 7¼ by 15-in.; 20½-in. rotary table.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	22	20	60	
Surface	17½ (97⁄8)	13⅜	494	375
Protection	12¼ (9)*	9⅝	5,505	800
Long	8¾†-6¼‡	7	7,105	400

*Drilling, 494-5,505 ft. †Drilling, 5,505-7,105 ft. ‡Drilling, 7,105-7,375 ft.

PENETRATION RATES AND BITS
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	97.5	74.5
Mechanical downtime	1.4	1.1
Mix mud, hole condition, lost circulation	1.6	1.2
Schlumberger	1.1	0.8
Drill-stem test	2.8	2.1
Fishing	3.1	2.4
Casing—Reaming, running, WOC	20.1	15.3
Completion—Swab, flow, test	3.4	2.6
Total	131.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
97⁄8	2	516	51.5	10.0	258	45.8
9	44	5,017	958.8	5.2	114	21.8
8¾	34	1,587	881.8	1.8	46	25.9
6¼	9	235	170.0	1.4	26	18.9
			Reaming			
22	1	64	5.0	12.8	64	5.0
17½	1	431	15.0	28.7	431	15.0
12¼	5	4,001	131.5	30.4	800	26.3

Drilling Comments and Discussion

Crooked-hole conditions in this important field in the southern part of the Wind River basin made necessary use of light drilling weights throughout the well and weights were not allowed to exceed 4 tons. As a result, penetration rates were reduced and bit consumption was relatively high; 80 bits were required to reach the Tensleep at 7,100 ft. The 11-day spread between rotating progress and net progress curves indicates an average of 3 hours per trip for bits (including rig service and drift surveys). The very low number of hours per trip may be due to weaknesses in reported time information but the operating efficiency of the rig was good.

●

Wind River Basin— Beaver Rim Wildcat (7,343 Ft.) WR-4

Well—Sohio Petroleum Co. 1 Government, C NE SW 27-31n-95w, Fremont County, Wyoming.

Contractor—George Acuff Drilling Co., Casper, Wyo. **Spud**—9-8-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	22	16	202	300
Surface	13¾	10¾	1,154	600
Long	*9			

*Drilling, 1,154 to 7,343 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Total Depth)

	Days	Per cent
On bottom, normal trips, rig service, etc.	54.6	60.5
Coring and reaming (including trip)	7.5	8.3
Mechanical downtime	6.7	7.4
Hole condition, mix mud	2.9	3.2
Circulate samples, wait on orders	4.7	5.2
Surveys—Schlumberger	1.7	1.9
Drill-stem test	4.0	4.4
Weather	1.5	1.6
Casing—Reaming, running, WOC	6.9	7.5
Totals	90.5	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	55.4	7,239	1,063.5	6.8	130.8	19.2
			Reaming			
13¾	1	209	7.0	28.9	200	7.0
22	1	206	7.2	28.6	206	7.2
13¾	1	951	33.5	28.4	951	33.5
9	3.6	106	37.7	2.7	28.6	10.5
			Coring			
7¼	1	3	1.7	1.8		
6⅛	2	103	42.5	2.4		

Mud additives . . . Aquagel, 47,400 lb.; barium carbonate, 32,660 lb.; Tannex, 8,635 lb.; caustic, 4,735 lb.; Smentox, 3,600 lb.; Driscose, 650 lb.

Drilling Comments and Discussion

This 7,343-ft. Tensleep test in the central part of the Wind River basin was charted to extend control further south in the basin. The depths at which formations are encountered are almost comparable to Sand Draw field well, about 15 miles to the south. Penetration in this well

was considerably faster. The following table compares penetration in these two wells:

	Well A*	Well B†
Depth	6,770	6,990
Net days	78	48
Number of bits	68	45
Feet per net day	87	144
Feet per bit	99.5	153

*Sinclair Oil & Gas Co. 13 Unit, Sand Draw field, Fremont County, Wyoming. †Sohio Petroleum Co. 1 Government, Beaver Rim wildcat, Fremont County, Wyoming.

Drilling weights were much lower in the Sand Draw well, averaging 2 tons. In the subject well, weights carried on bit ranged from 4 to 8 tons. Marked crooked-hole tendencies were evident in both wells.

●

Green River Basin—Wildcat (6,129 Ft.) GR-1

Well—Cosden Petroleum Corp. 1 Miller, SE SE SE 32-30n-112w, Sublette County, Wyoming.

Contractor—Clark Drilling Co., Billings, Mont. **Spud**—10-7-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾ (9)	10¾	802	456
Long	*9			

*Drilling 802-6,129 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Abandonment)

	Days	Per cent
On bottom, normal trips, rig service, etc.	45.8	60.3
Mechanical downtime	9.0	11.8
Mix mud, hole condition	1.4	1.8
Circulate samples, wait on orders	3.4	4.5
Surveys—Schlumberger	0.3	0.4
Drill-stem test	5.4	7.1
Drilling on junk	0.1	0.1
Weather	0.1	0.2
Casing—reaming, running, WOC	5.5	7.2
Abandonment	5.0	6.6
Total	76.0	100.0

PENETRATION RATES AND BITS

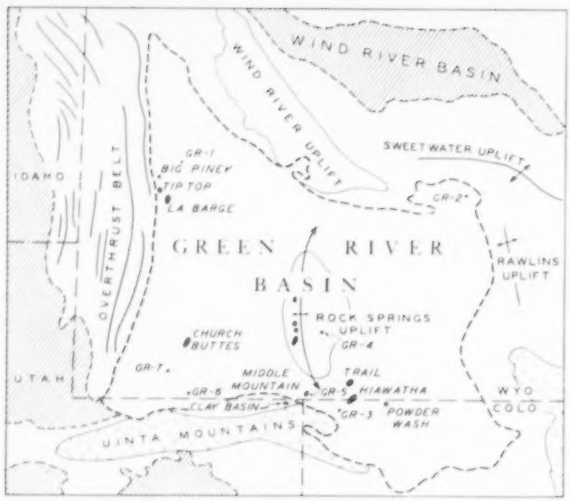
Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	38	6,129	850.5	7.2	16.1	22.4
			Reaming			
13¾	2.0	926	52.75	17.5	463	26.9

Mud additives . . . Bentonite, 70,500 lb.; quebracho, 1,670 lb.; caustic, 1,005 lb.; Barite, 2,000 lb.; sodium bicarbonate, 600 lb.; fiber, 16 sacks; hulls, 20 sacks.

Drilling Comments and Discussion

This wildcat well on the western side of the Green River basin was analyzed to provide additional control in this area. This well is located about 10 miles northeast of the Tip Top discovery, General Petroleum Corp., 4X-12-G Govt., 12-28n-114w. Unlike the Tip Top well which had severe crooked-hole problems, this well did not drift over 1° until reaching a depth of about 5,000 ft., at which depth the hole deviated to 3¼°.

Drilling weights were not high, averaging about 7 to 8 tons throughout. Coring was not performed; however, there were seven drill-stem tests run, requiring 5.7 days to evaluate shows. Total depth of the well was 6,129 ft. and the upper Mesaverde was the deepest formation tested.



●

Green River Basin—Wertz Field (6,800 Ft. Madison Pay) GR-2

Well—Sinclair Oil & Gas Co. 34 Wertz Unit, SE NW 7-26n-89w, Sweetwater County, Wyoming.

Contractor—Peak Drilling Co., Inc., Casper, Wyo. **Spud**—11-12-49.

Rig description—Model 75 draw works; mounted on a 131-ft. jackknife derrick with 15 by 15-ft. base; motors—two Model LRO six-cylinder 700-hp. engines; pumps—one C-150, 6¾ by 12-in., and one C-250, 7½ by 15-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17¼	13⅜	313	250
Long	9	7	6,797	565

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Tear Down)

	Days	Per cent
On bottom, normal trips, rig service, etc.	118.5	59.3
Coring and reaming (including trips)	30.8	15.4
Mechanical downtime	3.5	1.8
Mix mud, lost circulation, hole condition	1.9	1.0
Schlumberger, Lane-Wells	1.1	1.6
Drill-stem test	4.2	2.1
Fishing, drilling on junk	3.1	1.6
Casing—reaming, running, WOC	5.9	2.5
Completion—plug back, abandon	31.3	15.7
Total	200.3	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	109.1	6,384	2,320.50	2.7	57.5	21.4
			Reaming			
17¼	1	316	16.25	19.5	316	16.25
9	19.9	455	257.50	1.7	22.9	12.9
			Coring			
6⅛*	5	455	244.75	1.9	91	49.9

*Diamond bits.

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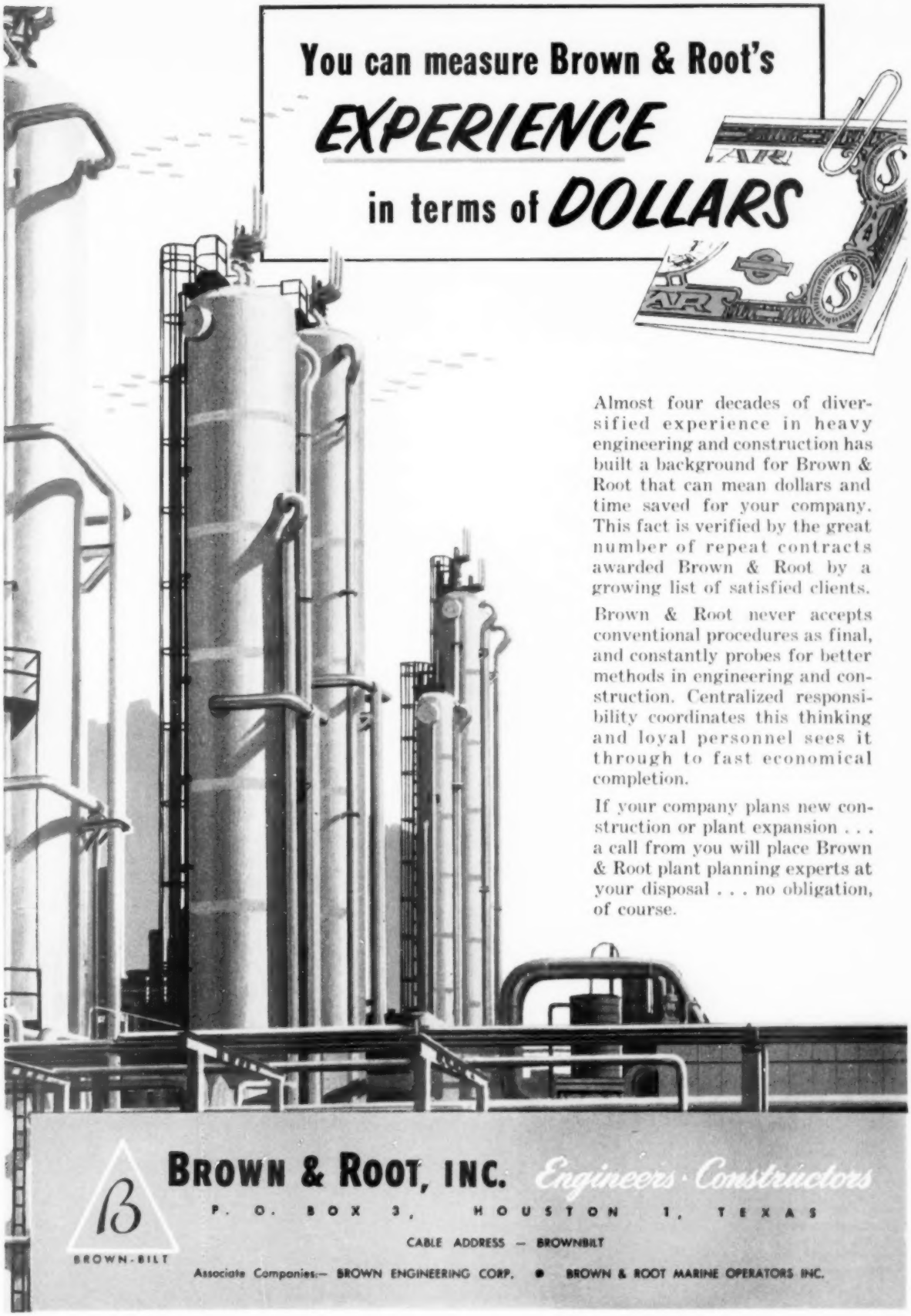

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Mud additives . . . Bentonite, 96,400 lb.; calcium sulfate, 8,500 lb.; Jel Flake, 600 lb.; cotton seed hulls, 3,000 lb.; caustic, 775 lb.; quebracho, 1,405 lb.

Drilling Comments and Discussion

This 6,893-ft. Wertz field development well exhibits the same difficult drilling conditions as the Lost Soldier field 4 miles to the west, but to a lesser degree. Penetration characteristics in drilling to the Madison of the two wells is compared as follows:

SURFACE TO MUDDY

	Well A*	Well B†
Thickness interval	2,810	3,400
Net days	36	31
Number of bits	43	33
Feet per net day	78	100
Feet per bit	65	103
Drilling weight, thousands of tons	2	3
Pump pressure, psi.	300-400	300-400

MUDDY TO MADISON

Thickness interval	3,070	3,040
Net days	‡101	†98
Number of bits	‡120	‡85
Feet per net day	30	31
Feet per bit	26	36
Drilling weight, thousands of tons	3½	4
Pump pressure, psi.	350-400	350-500

*Sinclair Oil & Gas Co. 5 Harry Wilburn, Lost Soldier field, Sweetwater County, Wyoming. †Sinclair Oil & Gas Co. 34 Wertz Unit, Wertz field, Sweetwater County, Wyoming. ‡Estimated, assuming no coring or reaming.

Crooked-hole tendencies observed in both wells required the application of low drilling weight; these rates were nearly the same, being 46.2 ft. per rotating day for Wertz and 46.7 for Lost Soldier field.

●

Green River Basin— Big Hole Area Wildcat (6,188 Ft.) GR-3

Well—Carter Oil Co. 1 Federal Land Bank of Wichita, 23-10n-94w, Moffat County, Colorado.

Contractor—Wagner & Wyant Drilling Co., Denver. **Spud**—9-30-51.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	495	250
Long	*9			

*Drilling 495-6,188 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Teardown)

	Days	Per cent
On bottom, normal trips, rig service, etc.	29.0	68.0
Coring and reaming (including trips)	0.9	2.1
Mechanical downtime	3.0	7.1
Mix mud	0.5	1.2
Circulate for samples	1.4	3.3
Schlumberger Survey	0.6	1.4
Drill-stem tests	1.6	3.8
Casing—Reaming, running, WOC	4.2	9.8
Completion—Plug and abandon	1.4	3.3
Total	42.6	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	22	6,180	521.8	11.8	281.0	23.7
			Reaming			
13¾	1	495	6.5	76.1	495.0	6.5
			Coring			
7½	1	8	6.5	1.2	8.0	6.5

Drilling Comments and Discussion

This well in the southeastern part of the Green River basin penetrated only Tertiary sediments. Drilling rates were exceptionally rapid and bit consumption very low compared to penetration through Tertiary beds in most areas in the Uinta basin to the west.

Low drilling weight was carried through the entire hole, since crooked-hole tendencies were evident. From the "Distribution of Rig Time" analysis it is observed that a small amount of time was consumed for drill-stem testing, hole conditioning, and well surveys.

●

Green River Basin— Hallville Wildcat (8,664 Ft.) GR-4

Well—Cities Service 1 Union Pacific, C NE NE 35-19n-102w, Sweetwater County, Wyoming.

Contractor—Peak Drilling Co., Inc., Casper, Wyo. **Spud**—6-21-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	26	26	83	148
Surface	17¼ (12¼)	13⅜	1,436	1,168
Long	*9			

*Drilling 1,436-8,644 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	77.7	69.7
Coring and reaming (including trips)	6.6	6.0
Mechanical downtime	4.6	4.2
Hole condition, mix mud	2.1	1.9
Circulate samples, wait on orders	2.3	2.1
Surveys—Schlumberger	1.4	1.3
Drill-stem test	10.2	9.2
Fishing	0.1	0.1
Casing—reaming, running, WOC	5.2	4.7
Plug and abandon	0.9	0.8
Total	110.1	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	6	1,303	152.5	8.6	218	25.4
9	66.9	7,131	1,335.3	5.4	107	20.0
			Reaming			
26	1	85	5.0	17.0	85	5.0
17¼	3	1,390	32.0	43.5	463	11.0
12¼	1	124	3.0	41.3	125	3.0
9	1.1	186	22.8	8.0	165	2.1
			Coring			
6⅛*	1	210	54.5	3.9		

*Diamond bits.

Drilling Comments and Discussion

An unusual condition of this central Green River basin wildcat is the difficult penetrability of the upper 2,200 ft. of hole. Penetration from 2,200 to 5,500 ft. was much

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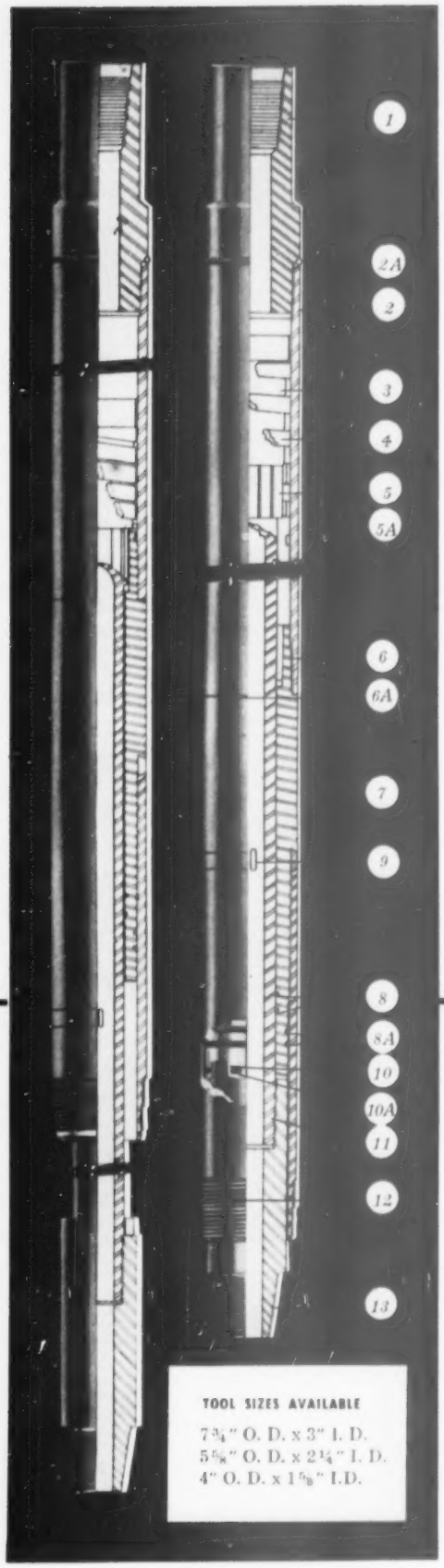

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easier but from 5,500 to 8,644 ft. in Tensleep, penetration became increasingly difficult. A total of 19 successful drill-stem tests were conducted and 1 failure required 10.2 days.

●

Green River Basin— Middle Mountain Discovery (8,506 Ft.) GR-5

Well—Stanolind Oil & Gas Co. 1 Unit, NE NE 10-12n-103w, Sweetwater County, Wyoming.

Contractor—Anschutz Drilling Co., Wichita, Kans. **Spud**—6-10-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	20	20	100	450
Surface	13¾ (9)	10¾	827	
Long	*9	7	7,845	450
	‡5⅞			

*Drilling 827-7,895 ft. ‡Diamond-coring, 7,845-8,506 ft.

DISTRIBUTION OF RIG TIME
(Below Conductor Pipe to Setting Long String)

	Days	Per cent
On bottom, normal trips, rig service, etc.	48.0	46.6
Coring and reaming (including trips)	7.0	6.8
Mechanical downtime	8.0	7.8
Mix mud, lost circulation, hole condition	6.1	5.9
Circulate samples, wait on orders	2.9	2.8
Surveys—Schlumberger and Lane-Wells	3.2	3.1
Drill-stem test	12.5	12.2
Fishing	9.0	8.7
Casing—Reaming, running, WOC	6.3	6.1
Total	103.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	65.7	8,332	829.7	10.1	127	12.6
	1—9-in. bit used drilling cement					
			Reaming			
20	1	65	10.8	6	65	10.8
13¾	3	850	28.5	29.8	283.3	9.5
9	3.3	174	25.5	6.8	52.8	7.7
			Coring			
5⅞	1	174	48.3	3.6		

Mud additives . . . Bentonite, 110,100 lb.; caustic, 2,545 lb.; quebracho, 7,655 lb.; barites, 4,600 lb.; Driscose, 725 lb.; SAPP (sodium acid polyphosphate), 85 lb.; lost circulation materials, 160 sacks.

Drilling Comments and Discussion

Discovery of oil in the Mesaverde formation at this Middle Mountain wildcat in the fall of 1952 intensified interest in the Green River basin.

This well required 54.8 net days and 35.6 rotating days to reach total depth of 8,506 ft. although the well was plugged back for completion in the Mesaverde sandstone. A total of 103 over-all days were consumed in drilling (below conductor pipe to setting of oil string).

The spread of 48.2 days separating the net and over-all drilling progress curves was due to several causes. Largest single item was 12.5 days to take 18 drill-stem tests. Fishing required 9 days and mechanical downtime consumed another 8 days. Circulation losses and other mud and bore-hole problems required 6 days. Maximum deviation of bore hole was only 1¾°.

Green River Basin— Wildcat (7,576 Ft.) GR-6

Well—California Co. 1 Spring Branch Unit, C SE NW 26-13n-111w, Sweetwater County, Wyoming.

Contractor—Noble Drilling Corp., Tulsa. **Spud**—11-29-51. **Rig description**—Model 50 draw works.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	15 (275 ft.)			
Surface	13¾	10¾	824	400
Long	*9⅞-‡8¾			

*Drilling 275-6,275 ft. ‡Drilling 6,275-7,576 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Tear Down)

	Days	Per cent
On bottom, normal trips, rig service, etc.	63.5	74.4
Coring and reaming	1.6	1.9
Mechanical downtime	3.8	4.5
Mix mud, lost circulation, condition hole	1.8	2.2
Circulate samples, wait on orders	2.8	3.5
Schlumberger	3.0	3.7
Drill-stem tests	2.2	2.7
Weather and others (including plugging)	0.8	0.2
Casing, reaming, running, WOC	5.8	6.9
Total	85.3	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
15	1	265	20.0	265	13.2	20.0
9⅞	62	6,244	769.0	100.7	8.1	12.4
8¾	22.5	1,290	299.5	57.3	4.3	13.3
			Reaming			
13¾	1	567	25.5	567	22.2	25.5
9⅞	1	20	2.5	20	8.0	2.5
8¾	1	22	6.5	22	3.4	6.5
			Coring			
6⅛*	1	42	11.0	42	3.8	11.0

*Diamond bit.

Mud additives . . . Bentonite, 81,800 lb.; Barite, 49,200 lb.; phosphate, 1,485 lb.; lime, 150 lb.; hulls, 800 lb.; quebracho, 7,010 lb.; caustic, 1,870 lb.; Smentox, 1,100 lb.; Stratacrete, 3,600 lb.

Drilling Comments and Discussion

Wells were chosen from Dry Creek and Spring Branch fields in the southwestern portion of Green River basin of Wyoming. These two wells were drilled by the same rig for the same operator and penetrated the same Tertiary formational sequence at about the same depths. Dry Creek was drilled to 5,922 ft. (2,700 ft. into the Wasatch) while Spring Branch well was drilled to 7,576 ft. (1,200 ft. into the Fort Union formation). Wasatch was topped at 3,250 ft. at Dry Creek and at 3,350 ft. at Spring Branch.

Penetration characteristics differed widely over the interval of from 2,750 to 5,375 ft. in the two wells. In the Dry Creek well, 16 jet bits were employed whereas 34 rock bits were required to cut the same interval in the Spring Branch well. The following table further compares penetration conditions throughout this interval:

INTERVAL FROM 2,750 TO 5,490 FT.

	Well A*	Well B†
Interval analyzed	2,740	2,740
Net days	15	‡24
Number rotating days	13	17
Number bits	¶16	34
Feet per net day	183	114

Feet per rotating day	211	161
Feet per bit	171	81
Drilling weight, thousands of tons	10	10
Table speed, r.p.m.	90-100	90-100
Pump pressure, psi.	550	475

*The California Co. 1 Dry Creek Unit, Sweetwater County, Wyoming. †The California Co. 1 Spring Branch Unit wildcat, Sweetwater County, Wyoming. ‡Estimated, assumes no coring. ¶Jet bits.

The wider spread between the rotating and net progress curves at Spring Branch as compared to Dry Creek reflects the greater number of trips. Of interest, however, is that the average normal trip to 5,900 ft. (including rig service, drift surveys, etc.) required 5.3 hours in each well.

●

Green River Basin— Wildcat (13,370 Ft.) GR-7

Well—Mountain Fuel Supply Co. 1 Grizzly Butte Unit, NE SE SW 35-15n-113w, Uinta County, Wyoming.

Contractor—Delta Drilling Co., Tyler, Tex. **Spud**—8-15-51.

Rig description—Model J-1250 draw works mounted on a standard 154-ft. derrick with a 30 by 30-ft. base; motors—four Model VU 420 engines; pumps—two FXL 7¾ by 20-in.; 20½-in rotary table.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½	13⅜	274	220
Protection	12¼	9⅝	5,986	604
Long	*8⅜-†8½	6⅝	13,368	500

*Drilling, 5,986-12,950 ft. †Diamond-coring, 13,950-13,368 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Setting Production Casing)

	Days	Per cent
On bottom, normal trips, rig service, etc.	122.8	69.1
Coring and reaming (including trips)	28.3	15.9
Mechanical downtime	9.9	5.6
Mix mud, condition hole	2.1	1.2
Schlumberger	1.7	0.9
Drill-stem test	2.9	1.6
Stuck pipe, drill junk	1.7	0.9
Casing—Reaming, running, WOC	8.5	4.8
Totals	177.9	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
12¼	40	5,986	593.8	10.1	150	14.7
8⅝	124.6	6,751	1,499.3	4.5	54.3	12.0
8½	1	30	16.5	1.8	30	16.5
			Reaming			
17½	1	274	4.5	60.8	274	4.5
8⅝	3.4	213	41.8	5.1	62.3	12.3
8½	4	124	33.0	3.8	31.0	8.3
8½*	2	266	48.0	5.5		
			Coring			
8½*	1	70	27.3	2.6		
6¼*	3	213	102.5	2.1		
6⅛*	4	320	127.75	2.5		

*Diamond bits.

Mud additives . . . Bentonite, 193 sacks; barite, 530 sacks; lime, 276 sacks; Quadrophos, 3,000 lb.; caustic, 5,775 lb.; quebracho, 3,400 lb.; Kembreak, 28,900 lb.; starch, 14,450 lb.; Pyrophosphate, 100 lb.; Driscose, 250 lb.; oil, 294 bbl.

Drilling Comments and Discussion

This 13,370-ft. wildcat in the southwestern part of the Green River basin, Wyoming, presented few problems for a test to this depth in the Rocky Mountain area. Comparatively high drilling weights were carried throughout the hole, reaching 24 tons at 5,000 ft. while drilling 12¼-in. hole. Apparently there was little tendency for the hole to drift and deviation never exceeded 1°.

Penetration rate showed a decided decrease after reaching the Frontier formation at about 12,600 ft. A total of 6 months were spent on the well from spud date to setting casing at total depth. Considering this fact and the low water loss maintained throughout the hole, the amount of mud used was reasonable.

●

Hanna Basin— Sundance Discovery (6,250 Ft. Pay) HA-1

Well—British-American Oil Producing Co. 1 Horne Bros.-State, NW SW NW 16-21n-78w, Carbon County, Wyoming.

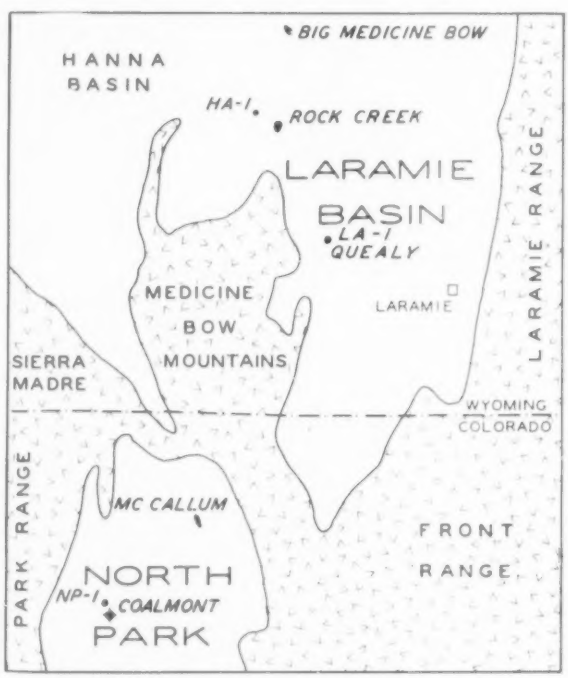
Contractor—Exploration Drilling Co., Denver. **Spud**—9-10-51.

Rig description—Model 75CA draw works mounted on a 133-ft. standard mast, and 10-ft.-high substructure; motors—two LRZU engines; one C-250 7¼ by 14-in., and one C-350 7¼ by 18-in.; two 8 by 30-ft. steel mud tanks; two QRC 13¾-in. blowout preventers.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17½ (95⅛)	13⅜	303	295
Long	9-*6⅛	7	6,307	500

*Diamond coring 6,307-6,656 ft.

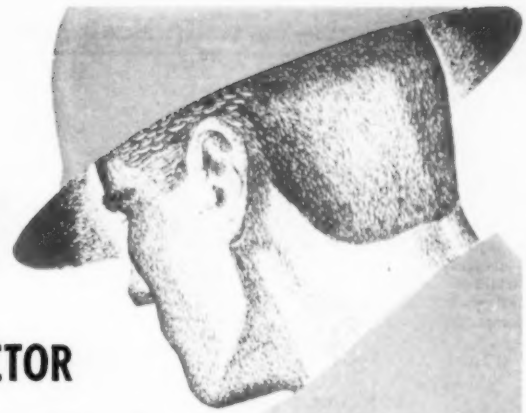


LOCK ON

VETCO

OFF-N-ON

DRILL PIPE AND CASING PROTECTOR



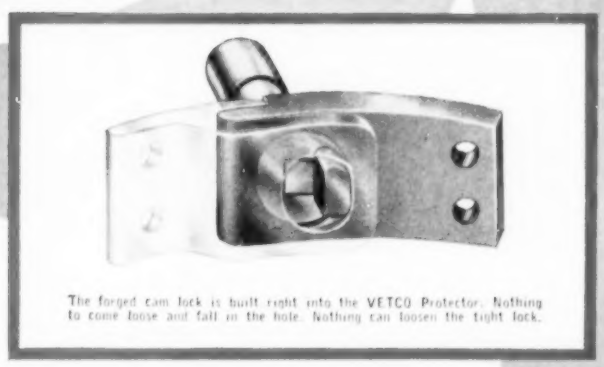
The VETCO is installed on the pipe. Cam locks are engaged easily by hand. And then are locked tightly by means of a "T" handle wrench which is the only tool needed.

pays for itself in rig time saved...

VETCO Protectors go on and come off fast — 8 to 10 seconds. With one quick motion you lock VETCO Protectors on the joint you want. You get complete flexibility and complete control with rubbers on only the joints you want. Your own crew puts Protectors on and off without waiting for a service crew.

The cam locks the Protector on with a tight grip that won't jar loose, can't slip, and won't move in any way. This cam lock is easy to open and to close; yet it closes with a positive grip that can't work loose. The cam lock is an integral part of the VETCO Protector with nothing to misplace, nothing to drop off in the hole. Frequent changes do not hurt the Protector.

So now with complete freedom you can use pipe progressively throughout the string. The same rubbered pipe is not used at top hole all the time. You no longer need to lay down rubbered pipe while tripping. VETCO Off-N-On Protectors will pay out in rig time saved.



The forged cam lock is built right into the VETCO Protector. Nothing to come loose and fall in the hole. Nothing can loosen the tight lock.

The alloy steel bands form a strong skeleton to grip the pipe. Rubber is compressed between the metal bands and the pipe for a tight grip which prevents movement of the protector.

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DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	33.6	51.3
Coring and reaming (including trips)	1.5	2.3
Mechanical downtime	1.7	2.6
Mix mud, lost circulation, hole condition	8.2	12.5
Circulate samples, wait on orders	1.4	2.1
Surveys—Schlumberger and Lane-Wells	1.8	2.8
Drill-stem tests	7.5	11.4
Weather	0.5	0.8
Casing—reaming, running, WOC	8.7	13.3
Completion—plug back	0.6	0.9
Total	65.5	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9⅝	2	311	24.5	12.7	155	12.3
9	37	5,999	466.3	12.8	162	12.6
6¼	7	325	112.8	2.9	46.5	16.1
			Reaming			
17½	1	306	17.5	17.5	306	17.5
6⅛	1	6	7			
			Coring			
6⅛*	1	21	9.5	2.2		

*Diamond bit.

Mud additives . . . Bentonite, 104,200 lb.; lime, 970 lb.; soda ash, 1,170 lb.; caustic, 400 lb.; quebracho, 2,180 lb.; Driscose, 650 lb.; Jel Flake, 26 sacks; fiber, 109 sacks; cement, 2 sacks.

Drilling Comments and Discussion

Principal problem in this Sundance sand discovery well on east side of Hanna basin was hole conditioning (8.2 days) to prepare hole against caving below Muddy. A total of 15 net drilling days were required to Frontier at 5,000 ft. and 25 net days to 6,656 ft., total depth.

●

Laramie Basin— Seven Mile Wildcat (6,713 Ft.) LA-1

Well—The California Co. 2 Unit, NE SW NE 8-17n-77w, Albany County, Wyoming.

Contractor—Loffland Brothers Co., Denver. **Spud**—6-25-49.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor		16	44	50
Surface	13¾	10¾	576	230
Long	*9			

*Drilling 576-6,713 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	49.4	69.0
Coring and reaming (including trips)	6.6	9.2
Mechanical downtime	3.3	4.6
Mix mud, condition hole	0.9	1.3
Circulate samples, wait on orders	2.3	3.2
Surveys—Schlumberger	1.5	2.1
Fishing and working stuck pipe	3.5	4.9
Casing—reaming, running, WOC	3.4	4.7
Plugging and abandoning	0.7	1.0
Total	71.6	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	2	586	20.5	28.6	293	10.3
9	56.5	5,913	855.0	7.0	104.7	15.2
			Reaming			
9	4.5	214	25.5	8.4	47.5	5.7
			Coring			
6⅛	2	214	60.8	3.5		

Mud additives . . . Bentonite, 19,400 lb.; Jel-Oil, 4,825 gal.; red mud, 272 gal.; quebracho, 50 lb.; barium carbonate, 2,400 lb.

Drilling Comments and Discussion

Located on the northwest edge of the Laramie basin in southern Wyoming, this 6,713-ft. wildcat gives additional control in this area. Of special interest on this well is the problem of crooked-hole tendencies below 3,300 ft.

Decrease in drilling weight at 3,350 ft. to straighten the hole is reflected by a marked decrease in penetration rate. A maximum deviation of 7½° was reached in this well at 6,650 ft., with drilling weights averaging about 2 to 4 tons below 3,300 ft.

Penetration characteristics and bit consumption on this well are similar to those in the Cooper Cove well—Stanolind Oil & Gas Co. 3 Johnson-Parkinson, located 5 miles to the north. Drilling conditions and 9-in. bit performance in the two wells are compared as follows:

	Well A*	Well B†
Interval analyzed	6,000	6,000
Number of net days	44	40
Number of bits	46	44
Feet per hour	6.9	7.0
Feet per bit	103.3	104.7
Hours on bottom per bit	15.1	15.2

*The California Co. 3 Johnson-Parkinson, Cooper Cove, Albany County, Wyoming. †The California Co. 2 Unit, Seven Mile field, Albany County, Wyoming.

●

North Park Basin— Coalmont Wildcat (8,246 Ft.) NP-1

Well—Hiawatha Oil & Gas Co. 1-25 Government, C SW SW 25-7n-81w, Jackson County, Colorado.

Contractor—Heasley & Crumpler Drilling Corp. **Spud**—11-11-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	348	400
Long	*9⅞			

*Drilling 348-8,246 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	72.7	64.1
Coring and reaming (including trips)	9.3	8.2
Mechanical downtime	3.7	3.3
Hole condition, lost circulation, mix mud	6.3	5.5
Circulate samples, wait on orders	2.9	2.6
Schlumberger	1.3	1.1
Drill-stem test	4.0	3.4
Weather	3.0	2.6
Fishing	5.5	4.8
Casing—reaming, running, WOC	3.8	3.3
Plug and abandon	1.3	1.1
Total	113.6	100.0

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PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	389	12.5	31.1	389	12.5
9⅞	51.5	7,690	1,376.5	5.6	150	26.7
	(Note: Used fishing one 9⅞-in. bit)					
			Reaming			
9⅞	3.5	167	40.0	4.2	48	11.4
			Coring			
7¾*	1	167	93.5	1.8		

*Diamond bit.

Mud additives . . . Barite, 108,000 lb.; bentonite, 74,400 lb.; lime, 17,950 lb.; starch, 8,350 lb.; Kembreak, 7,250 lb.; caustic, 4,825 lb.; Driscose, 1,100 lb.; quebracho, 400 lb.; Visco, 25 lb.; fiber, 12 sacks.

Drilling Comments and Discussion

This 8,245-ft. granite test on the Coalmont anticline in North Park is a north offset to the discovery well. Only 27 bits were required to reach the Frontier in this well compared to 41 bits consumed in the discovery well to the same formation. However, the net drilling days required were similar in both wells.

Subject well encountered more hole problems and circulation losses than were experienced in the discovery; a total of 6.3 days were expended on hole problems in subject well as compared to 2.3 days in the discovery.

●

Denver-Julesburg Basin— Fort Collins Field (7,352 Ft.) DJ-1

Well—California Co. 1 C. E. Meyers, C SE SW 19-8n-68w, Larimer County, Colorado.

Contractor—Noble Drilling Co., Tulsa. **Spud**—12-8-52.

Rig description—Model 96 draw works mounted on a 136-ft. derrick; motors—three diesel engines; pumps—one 220-P, and one C-350, 7¼ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15	10¾	1,015	850
Protection	*9⅞	5½	4,600	
Long	†8⅞			

*Drilling 1,015 to 6,150 ft. †Drilling 6,150 to 7,352 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	41.3	45.1
Coring and reaming (including trips)	41.1	45.0
Mechanical downtime	0.4	0.4
Hole condition, lost circulation, mix mud	0.1	1.1
Circulate samples, wait on orders	1.8	2.0
Surveys—Schlumberger, Lane-Wells	1.2	1.3
Drill-stem test	0.8	0.9
Casing—reaming, running, WOC	3.8	4.2
Total	91.4	100.0

Drilling Comments and Discussion

This granite test well was analyzed to gain additional control in the western side of the Denver-Julesburg basin and also to illustrate drilling characteristics to the Lyons (Permian) formation, in which there has been recent and intense industry interest.

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9⅞	52.1	6,012	706.1	8.5	115.2	13.5
9	2	17	7.0	2.4	2.4	3.5
			Reaming			
15	2	1,015	37.2	27.3	507.5	18.6
9⅞	2.9	137	27.7	6.0	47.2	7.8
			Coring			
6⅛*	2	137	57.5	2.4		
8⅞*	5	1,186	691.0	1.7		

*Diamond bits.

Mud additives . . . Bentonite, 61,000 lb.; Zeogel, 39,280 lb.; starch, 38,300 lb.; gypsum, 9,000 lb.; preservative, 5,000 lb.; Smentox, 1,500 lb.; quebracho, 250 lb.; Driscose, 250 lb.; Silvacel, 44 sacks; Gel Flake, 42 sacks.

Penetration rate averaged 300 ft. per day to the Dakota at about 3,800 ft. and then decreased to about 80 ft. per day to 6,150 ft. Hole was diamond cored from this depth to the granite found at a total depth of 7,352 ft. To the Lyons formation at 5,880 ft., 40 over-all days, 36 net days, and 43 rock bits were required.

Circulation losses were experienced in the Graneros formation but did not create a serious problem. Drilling weights averaged 3 to 4 tons to 5,000 ft. and about 12 tons from 5,000 ft. to total depth. Crooked-hole characteristics offered no problem with the maximum deviation being only 1½° at 5,000 ft. This well was completed as a water well by another operator.

Denver-Julesburg Field—Borie Pool (7,803 Ft. Pay) DJ-2

Well—The California Co. 1 Wyoming-State, SE NE SW 24-13n-68w, Laramie County, Wyoming.

Contractor—Kerr-McGee Oil Industries, Inc., Oklahoma City. **Spud**—6-2-51.

Rig description—Model 96 draw works on 136-ft. derrick; motors—three diesel engines; pumps—one Model 220-P, 8 by 20-in., and one Model C-350, 7¼ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor		16	38	
Surface	13¾	10¾	1,005	475
Long	*9	7	8,703	

*Drilling, 1,005 to 8,749 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release Date)

	Days	Per cent
On bottom, trips, service rig, etc.	34.1	50.1
Coring and reaming (including trips)	5.2	7.7
Mechanical downtime	4.3	6.3
Hole condition—Mix mud, lost circulation	5.4	7.9
Drill-stem test and Schlumberger	3.2	4.7
Casing—Reaming, running, WOC	7.6	11.2
Install BOP, swab, test and completion	8.2	12.1
Total	68.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	41	8,665	630.5	13.8	217	15.4
			Reaming			
13¾	2	967	13.3	72.6	483.5	6.7
9	1	34	14.8	7.0	34	4.8
			Coring			
6⅛*	1	131	81.3	1.6		

*Diamond bit. †Estimated.

Drilling Comments and Discussion

This well on the western extremity of the Denver-Julesburg basin near the Laramie Mountain range required about the same drilling time to 5,000 ft. as wells drilled farther out in the basin. However, bit consumption was about three times greater. Drill pipe was in compression from 5,500 to 7,100 ft. Caving trouble near total depth is attributable to drilling in compression.

●

Denver-Julesburg Basin—S. W. Potter Field (5,600 Ft. Pay) DJ-3

Well—Wytex Oil Corp. 3 I. J. Dunn, NE SE SE 3-13n-53w, Kimball County, Nebraska.

Contractor—Wagner & Wyant Drilling Co., Denver. **Spud**—1-25-52.

Rig description—Unit type 15 draw works mounted on a 128-ft. jackknife derrick; motors—two 200-hp. diesel engines; pumps—one D-300 7¼ by 14-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	526	375
Long	9	7	5,690	300

DISTRIBUTION OF RIG TIME
(From Spud Date to Cementing Long String)

	Days	Per cent
On bottom, normal trips, rig service, etc.	11.4	53.4
Coring and reaming (including trips)	2.2	10.3
Mechanical downtime	0.3	1.4
Mix mud, condition hole	0.8	3.7
Schlumberger	0.5	2.3
Drill-stem test	2.7	12.6
Casing—reaming, running, WOC	3.5	16.3
Total	21.4	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	10	5,635	238.3	23.6	563.5	23.8
			Reaming			
13¾	1	539	8.0	67.3		
			Coring			
8¾*	1	55	37.0	1.5		

*Diamond bit.

Mud additives . . . Bentonite, 205 sacks; lime, 1 sack; quebracho, 1,675 lb.; caustic, 480 lb.; soda ash, 900 lb.; phosphate, 790 lb.

Drilling Comments and Discussion

This Dakota well in the Potter area, Kimball County, Nebraska, required 11.7 net days to coring point at 5,520 ft. Net drilling progress was somewhat slower than anticipated due to the tendency of the bits to become balled up. Unusual problems were not encountered.

●

Denver-Julesburg Basin—Yenter Field (5,000 Ft. Pay) DJ-4

Well—British-American Oil Producing Co., Dallas, 4-A Ziegler, 300 N/S 330 W/E 7 NE, 3-8n-54w, Logan County, Colorado.

Contractor—Herndon Drilling Co., Tulsa. **Spud**—2-13-52.

Rig description—Model 50A draw works on a 127-ft. mast and 14-ft.-high substructure; motors—2 Model 6G510 engines; pumps—one 7¼ by 18-in. (Rig 2).

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	9⅝	216	150
Long	8¾	5½	5,209	350

DISTRIBUTION OF R5G TIME
(From Spud Date to Cementing Long String)

	Days	Per cent
On bottom, normal trips, rig service	6.8	51.9
Coring and reaming (incl. trips)	1.2	9.2
Mechanical downtime	1.1	8.4
Mix mud, lost circulation, hole condition	.5	3.8
Circulate samples, wait on orders	.4	3.0
Schlumberger	.2	1.5
Casing—running, reaming, WOC	2.9	22.2
Total	13.1	100.0

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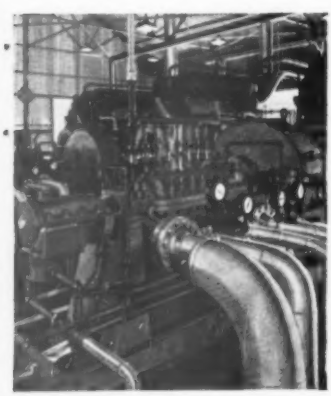
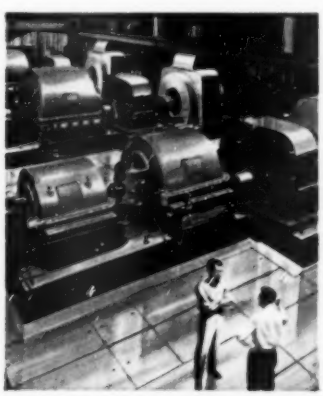


PACIFIC PUMPS, INC., Huntington Park, Calif. Centrifugal pumps, deep oilwell plunger pumps, hot oil and boiler feed pumps.



ROOTS-CONNERSVILLE BLOWER DIVISION, Connersville, Ind. Rotary positive blowers, gas pumps, centrifugal blowers, exhausters; positive displacement meters.

SECURITY ENGINEERING DIVISION, Whittier, Calif., Dallas, Tex. Rock bits, reamers, casing scrapers, reamer rock bits, coring bits, Securaloy.

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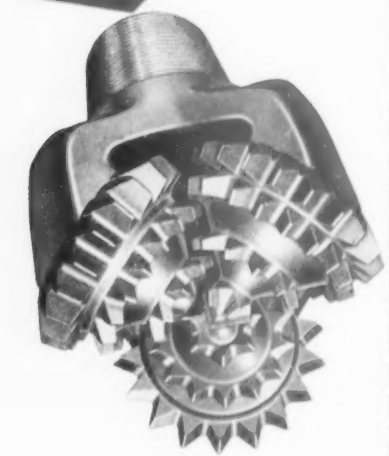
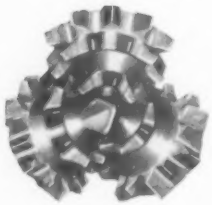
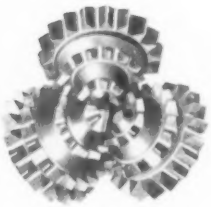


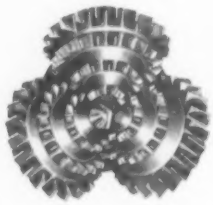


Type S3 Designed for rapid penetration in soft formations. S3 cutter teeth are exceptionally long and widely-spaced to minimize tooth contact on bottom and facilitate effective cleaning.

Type S6 Unsurpassed for fast cutting with light or heavy weights in medium shales, gypsum, salt, chalk, anhydrite, medium lime and unconsolidated formations.

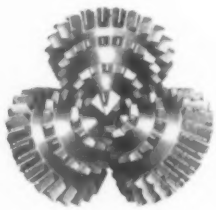


Type M4 For drilling medium and semi-hard formations such as sand, medium shales, medium hard lime and conglomerates.

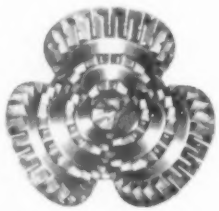


Type M5 Teeth are closely spaced and sturdy in section. Imparts a chipping and crushing action for effective penetration in formations such as medium hard lime, hard shale and medium hard anhydrite.

Type H7 For drilling hard formations. Used in hard formations such as lime, shale and anhydrite.



Type H7L For drilling hard formations. Used in hard formations such as lime, shale and anhydrite where some extra amount of gage protection is necessary.



Type H7W This bit provides fast cutting and long life through extremely hard, abrasive formations. Maximum gage protection is provided by a circumferential web on the gage row of teeth.

Jet or Standard Circulation

Security 3-Cutter Rock Bits are available with jet as well as standard circulation. The jet bits have a high efficiency due to the exclusive design and location of the jet nozzles.

B3C-2C-4

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PENETRATION RATES AND BITS

Size—(in.)	No. bits	Footage	No. hours	Ft./hour	Ft./bit	Hours on bot./bit
Drilling						
13¾	1	222	4.0	55.5	222	4.0
8¾	7.5	4,939	113.5	43.5	580	13.4
Coring						
6⅛	1	49	22.3	2.2		
Reaming						
8¾	0.5	49	8.3	5.9		

Mud additives . . . Bentonite, 20,000 lb.; soda ash, 1,075 lb.; Magcophos, 250 lb.; caustic, 150 lb.; quebracho, 650 lb.; seal flakes, 150 lb.

Drilling Comments and Discussion

This well is typically representative of drilling conditions to the present producing "D" and "J" sands in northeastern Colorado. Drilling progress is fast and bit performance exceptionally good, relative to most Rocky Mountain drilling.

In this well, the coring point at 5,130 ft. was reached in less than 6 net days with only seven 8¾-in. and one 13¾-in. rock bits. The 8¾-in. rock bits averaged 580 ft. per bit and 43.5 ft. per hour for the 4,939 ft. drilled. In view of the rapidity with which these wells are drilled, it is increasingly evident that efforts to reduce development costs should be directed toward reduction of completion costs.

●

Denver-Julesburg Basin—Middlemist Field (5,600 Ft. Pay) DJ-5

Well—Roden, Darden & McRae, Denver, 3-B, SW NW SW 20-2s-57w, Adams County, Colorado.

Contractor—Roden, Darden & McRae, Denver. **Spud**—8-30-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	144	150
Long	9	7	5,599	250

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	8.0	45.7
Coring and reaming (including trips)	2.8	16.0
Mechanical downtime	0.8	4.6
Mix mud, hole condition	0.4	2.3
Drill-stem test	1.6	9.1
Circulate samples, wait on orders	0.3	1.7
Casing—Reaming, running, WOC	3.6	20.6
Total	17.5	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
Drilling						
9	5.6	5,582	140.0	39.9	998	25.0
Reaming						
13¾	1	193	3.0	64.4		
9	0.4	36	4.0	9.0		
Coring						
6⅛*	1	55	17.3	3.2		

*Diamond bit.

Mud additives . . . Bentonite, 4,000 lb.; caustic, 75 lb.; quebracho and tannins, 685 lb.; soda ash, 150 lb.; phosphate, 450 lb.; oil, 128 bbl.

Drilling Comments and Discussion

This Middlemist field development well is located about 60 miles east and north of Denver in the southern portion of the Denver-Julesburg basin. Only 5 net days and five rock bits were required to reach the top of the D sand at 5,460 ft. As in most wells drilled in this basin, a large part of the over-all time was expended in completion, testing, and coring operations.

●

Denver-Julesburg Basin—Greasewood Pool (6,800 Ft. Pay) DJ-6

Well—Gifford Parker and J. G. Dyer 4 Kirchoff, C NW NW 12-6n-61w, Weld County, Colorado.

Contractor—Parker Drilling Co., Tulsa. **Spud**—1-2-52.

Rig description—Model 50 on a 127-ft. steel derrick and 5-ft. substructure; two EK engines; pumps—one 150-B, 7¼ by 12-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	15¾	10¾	205	150
Long	9	5½	6,817	250

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Tear Down)

	Days	Per cent
On bottom, normal trips, rig service, etc.	13.8	44.5
Coring and reaming (including trips)	4.7	15.2
Mechanical downtime	1.6	5.2
Mix mud, condition hole	0.7	2.2
Schlumberger	0.3	1.0
Weather, wait on orders	1.2	3.8
Casing—Reaming, running, WOC	4.7	15.2
Completion—Perforate, swab, test	4.0	12.9
Total	31.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
Drilling						
9	13.7	6,711	237.5	28.2	490	17.4
Reaming						
15¾	1	205	(?)	(?)	205	(?)
9	0.3	100	5.5	18.2		
Coring						
7¾*		100	51.8	1.9		

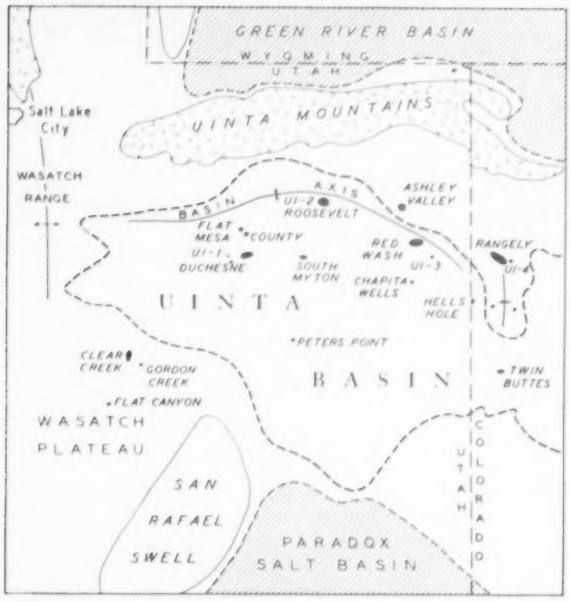
*Diamond bit.

Mud additives . . . Bentonite, 86 sacks; caustic, 775 lb.; quebracho, 1,100 lb.; phosphate, 290 lb.

Drilling Comments and Discussion

This Greasewood pool well has been charted to reflect drilling conditions and characteristics in a deeper part of the Denver basin than had previously been analyzed. Similarity is evident between the net-progress curve in this well and that in the Adon and the West Fiddler Creek wells in the Powder River basin which encountered the Muddy at comparable depths. This comparison is particularly interesting since the wells are 250 miles apart and in different geologic basins.

Pushing Tools—Uinta Basin



Uinta Basin— UI-1
Duchesne Field (7,300 Ft. Pay)

Well—Carter Oil Co. 2 Ute Tribal, C SE NW 16-4s-4w, Duchesne County, Utah.

Contractor—Carter Oil Co. tools. **Spud**—7-31-51.

Rig description—Model 125 draw works mounted on a 136-ft. jackknife derrick; motors—three Model PDTH diesel engines; pumps—two C-350 7¾ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	806	370
Long	*9	7	7,518	500

*Drilling 806-11,312 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Total Depth)

	Days	Per cent
On bottom, normal trips, rig service, etc.	125.7	49.1
Coring (including trips)	69.8	27.2
Mechanical downtime	8.1	3.2
Mix mud, hole condition, lost circulation	15.4	6.0
Circulate samples, wait on orders	4.3	1.7
Schlumberger	0.8	0.3
Drill-stem test	25.3	9.9
Fishing, drill junk	3.3	1.3
Weather	0.3	0.1
Surface casing—run, WOC	3.0	1.2
Total	256.0	100.0
Completion—surveys, run oil string, WOC, plug-back test	18.5	

Drilling Comments and Discussion

This analysis on the second Duchesne field well is a comparison with the discovery well. This well was drilled to a total depth of 11,312 ft. as opposed to 7,596 ft. on the discovery well. To comparable depths—7,600 ft.—the footage per rotating day (on bottom) averaged 132 ft. as compared to 103 ft. per rotating day in the discovery well using conventional rock bits.

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	5	815	76.0	10.7	163.0	15.2
9	144	8,642	2,116.8	4.1	60.0	14.7
8¾	2	36	17.0	2.1	18.0	8.5
			Coring			
8⅞*	7	1,819	1,127.8	1.6		

Note: Eight 9-in. rock bits used conditioning hole, milling, reaming, and fishing.
*Diamond bits.

Mud additives . . . Bentonite,* 54,790 lb.; Barites, 1,938,400 lb.; caustic, 15,025 lb.; quebracho and Tannins, 14,900 lb.; Carbonox, 11,375 lb.; Anhydrox, 2,900 lb.; Smentox, 400 lb.; cellophane, 211 sacks; Fibertex, 226 sacks; hulls, 14 sacks.
*Appears low—may be incomplete on tour reports.

Most of the improvement is attributable to penetration characteristics of the 1,000 to 2,000-ft. interval. Twice as many bits were used in the original well as in the second well through this interval which indicates that the crooked-hole tendencies were more severe in the discovery well, and time required through this interval was correspondingly high in the discovery.

From the "Distribution of Rig Time" table it is of interest that 25.3 days were required conducting 38 drill-stem tests. This time includes swabbing through the test tool at a depth of about 3,060 ft. Hole conditioning and lost circulation accounted for 15.4 days. As noted in the "Mud Additives" table, a large amount of barites (slightly under 1,000 tons) was used to maintain a mud ranging in weight from 12.5 lb. per gallon at 3,000 ft. to 14.2 lb. per gallon at total depth.

●

Uinta Basin— UI-2
Roosevelt Pool (8,700 Ft. Pay)

Well—Carter Oil Co. 1 Ute Tribal B, C NE SW 20-1s-1e, Uintah County, Utah.

Contractor—Carter Oil Co. tools. **Spud**—6-30-51.

Rig description—Model MC-450 draw works mounted on jackknife derrick; motors—three NKU 325 hp. engines each; pumps—two G-300 7¾ by 18-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	20	16	59	75
Surface	13¾	10¾	815	365
Long	*9	7	8,923	560

*Drilling 815-9,954 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Tear Down)

	Days	Per cent
On bottom, normal trips, rig service, etc.	87.8	44.1
Coring (including trips)	46.2	23.2
Mechanical downtime	9.3	4.7
Mix mud, lost circulation, hole condition	6.7	3.4
Drill-stem test	20.0	10.0
Drill junk	4.8	2.4
Schlumberger and Lane-Wells	2.0	1.0
Weather	1.0	0.5
Casing—reaming, running, WOC	10.4	5.2
Completion—plug back, run tubing	11.0	5.5
Total	199.2	100.0

Pushing Tools—Uinta Basin

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	4	825	75.0	11.0	212	18.7
9	116	7,898	1,341.0	5.9	68	11.6
			Reaming			
20	1	62	14.0	4.4	62	14.0
			Coring			
8⅞*	7	1,231	669.3	1.8		

*Diamond bits.

Mud additives . . . Bentonite, 180,200 lb.; Barite, 533,000 lb.; quebracho (and Tannins), 30,275 lb.; caustic, 19,490 lb.; barium carbonate, 29,100 lb.; sodium bicarb., 300 lb.; lime, 500 lb.; emulsifier, 26 drums; crude oil, 222 bbl.; Jel Flake, 130 sacks; Fibertex, 19 sacks; wool, 7 bales; hulls, 51 sacks.

Drilling Comments and Discussion

This Roosevelt field well was analyzed primarily to evaluate the effect of oil-emulsion mud on penetration of the Green River formation.

A comparison with 2 Ute Tribal shows a characteristic reversal in both wells thus suggesting that the reversal is due to the Green River formation rather than to the effect of using drilling fluid. A hard section occurs in the upper 700-800 ft. of the Green River formation in the two wells studied. Penetration of this upper Green River section averages 60 ft. per day and 32 ft. per bit as contrasted to 90 ft. per day and 50 ft. per bit for the succeeding 1,000 ft. of Green River formation. This reversal in net progress curve may also be noted in the Gusher wildcat situated in the same general area.

The present well drilled with oil-emulsion mud carried lighter drilling weights (up to 17½ tons) as opposed to a maximum of 28 tons employed in the previously analyzed Roosevelt field well.

Drilling characteristics of two Roosevelt field wells follow:

Drilling conditions—	Well A*	Well B†
Interval analyzed	8,500	8,500
Rotating hours	1,440	1,198
Number of bits	113	143
Number of feet per hour	5.9	7.1
Number of feet per bit	75	60

*Carter Oil Co. B 1 Ute-Tribal, Roosevelt field, Uintah County, Utah. †Carter Oil Co. 2 Ute-Tribal, Roosevelt field, Uintah County, Utah.

A gain of 242 hours on bottom is noted in 2 Ute Tribal over 1 Ute Tribal. However, B 1 Ute performance showed 30 fewer trips or 114 hours due to using fewer bits showing a gain of 128 hours to 8,500 ft. in favor of 2 Ute.

●

Uinta Basin— Red Wash Pool (5,500 Ft. Pay) UI-3

Well—The California Co. 8 Red Wash Unit, C SW NE 22-7s-23e, Uintah County, Utah.

Contractor—Kerr-McGee Oil Industries, Inc., Casper, Wyo.

Spud—9-11-51.

Rig description—Model 75 draw works; three Model PTDG diesel engines; pumps—one PHD 7¼ by 18-in., and one PHD 7¼ by 14-in.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Conductor	23	16	40	...
Surface	13¾	10¾	611	290
Long	*9⅞-†6⅛	7	5,558	150

*Drilling, 611-5,558 ft. †Diamond-coring, 5,558-5,820 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	32.9	48.0
Coring	4.9	7.2
Mechanical downtime	3.7	5.4
Mix mud, lost circulation	4.8	7.0
Circulate samples	0.9	1.3
Schlumberger and Lane-Wells	1.5	2.2
Drill-stem test	6.8	10.0
Casing—reaming, running, WOC	8.4	12.2
Completion—plug back, swab, test	4.6	6.7
Total	68.5	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	620	37.0	16.8	620	37.0
9⅞	43	4,937	573.5	8.6	115	13.3
6¼*	2	5	5.5			
			Reaming			
23⅜	1	45	3.0	15.0	45	3.0
			Coring			
6¼†	2	258	66.0	3.9	129	33.0

*Cleaning hole to core. †Diamond bits.

Mud additives . . . Bentonite, 1,152 sacks; Palco Wool, 90 bales; Fibertex, 112 sacks; cotton-seed hulls, 231 sacks; Jel Flake, 52 sacks; sawdust, 491 sacks; King Seal, 322 sacks; Magco Fiber, 56 sacks; caustic, 25 lb.; quebracho, 100 lb.; sodium bicarbonate, 200 lb.

Drilling Comments and Discussion

Drilling characteristics of this offset well in the Red Wash field well are compared with the discovery well completed in October 1951 1½ miles to the southeast. Net drilling progress in subject well was slower than in the discovery.

Drilling weights were comparable in both wells but rotary-table speeds employed in the discovery well were higher in a 9-in. hole than in the offset which cut a 9⅝-in. hole. Moreover, pump pressures in the discovery were considerably higher. Subject well required only 69 over-all days as compared to 82 over-all days in the discovery due to less time consumed in testing, well surveying, etc.

●

Uinta Basin— Rangely Field (6,200 Ft. Pay) UI-4

Well—Phillips Petroleum Co. (Wasatch) 5-25 Larson, C SW NW 25-2n-102w, Rio Blanco County, Colorado.

Contractor—Fred M. Manning Drilling Co., Denver.

Spud—3-28-48.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾	10¾	557	
Long	*9-†6⅛	7	6,200	900

*Drilling 557-6,200 ft. †Drilling 6,200-6,438 ft.

Pushing Tools—San Juan Basin

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release Date)

	Days	Per cent
On bottom, normal trips, rig service, etc.	42.5	69.7
Mechanical downtime	2.7	4.4
Mix mud, lost circulation, condition hole	4.0	6.6
Surveys—Schlumberger and Lane-Wells	0.6	1.0
Fishing, twistoffs	1.2	2.0
Casing—running, WOC	9.0	14.7
Completion—install well head, lay down drill pipe	1.0	1.6
Total	61.0	100.0

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
13¾	1	560	31.5	17.8	560	31.5
9	39	5,654	643.3	8.8	145	16.5
6⅛	5	224	44.5	5.0	45	8.9

Mud additives . . . Bentonite, 1,007 sacks; Baroid, 125 sacks; Palco wool, 69 bales; cotton seed hulls, 34 sacks; caustic, 1,375 lb.; quebracho, 1,650 lb.; Anhydrox, 3,825 lb.

Drilling Comments and Discussion

During early development at Rangely field, drilling operations required 120 days. However, drilling time was reduced to as low as 40 days with the use of heavier weights and greater number (15) of drill collars. Subject well required 45 new rock bits, 43 net days, and 61 total days. An unusual procedure was setting of 557 ft. of 10¾-in. to 2,900 ft.

●

San Juan Basin— SJ-1
Table Mesa Field (7,700 Ft. Pay)

Well—Continental Oil Co. 17 Table Mesa, SE SE 3-27n-17w, San Juan County, New Mexico.
Contractor—Loffland Brothers Co., Denver. **Spud**—9-17-50.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	17	13⅜	722	510
Protection	12¼	9⅝	4,679	300
Long	8¾	8	7,762	500

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)

	Days	Per cent
On bottom, normal trips, rig service, etc.	51.4	42.8
Coring and reaming (including trips)	9.0	7.5
Mechanical downtime	6.3	5.3
Mix mud, water flow, condition hole	6.4	5.3
Circulate samples	0.6	0.5
Drill-stem test	5.2	4.4
Schlumberger	1.8	1.5
Casing—reaming, running, WOC	8.7	7.3
Completion—perf., swab, acidize, flow and test	30.5	25.4
Total	119.9	100.0

Drilling Comments and Discussion

This deep test in the Table Mesa field was the discovery well in the Mississippian Ouray limestone, and was completed in January 1951. It was analyzed primarily for the purpose of giving drilling control through a rather thick section of formations in the San Juan basin area of New Mexico. A 12¼-in. hole was drilled to 4,680 ft. The 12¼-in. bits averaged 10.7 ft. per hour and 63 ft. per bit. Drilling to 7,800 ft. required 55 to 60 net days. Over-all time to total depth in this well was 86 days. An intermediate string of 9⅝-in. casing was set at 4,679 ft.

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
17	3	722	51.0	14.1	241	17.0
12¼	28	3,949	369.8	10.7	141	13.2
8¾	45	2,844	652.5	4.4	63	14.5
			Coring			
8¾*	4	160	51.3	3.1	40	12.8
8¾	8	73	37.3	2.0	9	4.7
7⅝*	1	13	7.3	1.8	13	7.3

*Wire line.

Mud additives . . . Bentonite, 1,314 sacks; clay, 100 sacks; Barite, 8,111 sacks; caustic, 5,080 lb.; quebracho, 12,800 lb.; Tannathin, 2,900 lb.; soda ash, 1,610 lb.; Magco Phos, 700 lb.; fiber seal, 183 sacks; Jel Flake, 10 sacks; Seal Flake, 119 sacks; Anti Gyp, 300 lb.

●

San Juan Basin— SJ-2
Blanco Field (4,700 Ft. Pay)

Well—El Paso Natural Gas Co. 2-H Howell, SW NE SW 14-30n-7w, Rio Arriba County, New Mexico.
Contractor—Denman Drilling Co. **Spud**—4-9-52.

BORE-HOLE, CASING, AND CEMENTING PROGRAM

	Bore-hole diam. (in.)	Casing diam. (in.)	Casing seat (ft.)	Cement (sacks)
Surface	13¾ (9)	9⅝	160	125
Long	8¾	7	3,105	125
Liner	6¼-*4¾	5¼	4,700	125

*Gas drilling from 4,700-5,490 ft.

DISTRIBUTION OF RIG TIME
(From Spud Date to Rig Release)*

	Days	Per cent
On bottom, normal trips, rig service, etc.	26.9	52.8
Mechanical downtime	1.5	2.9
Mix mud, condition hole	5.4	10.6
Circulate samples, wait on orders	1.2	2.4
Schlumberger	0.7	1.3
Drill-stem test	2.0	3.9
Weather and others	6.0	11.8
Casing—reaming, running, WOC	7.3	14.3
Total	51.0	100.0

*58 days lapsed between the tear down of the first rig and rig up of the second. This time is not included here.

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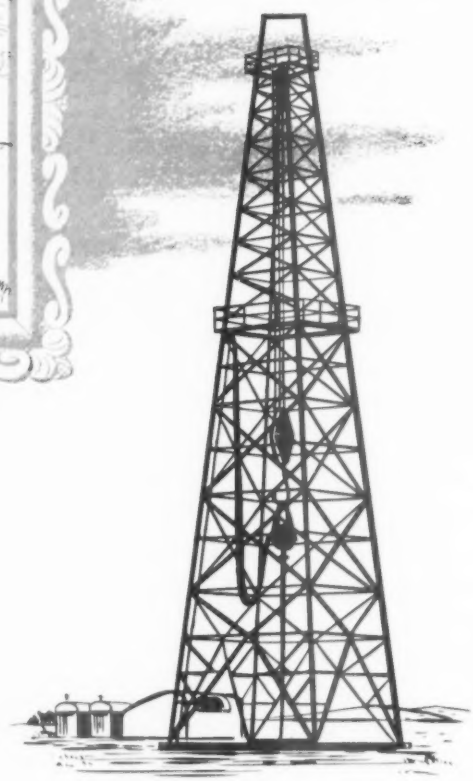
The Financial Picture

IS DIFFERENT, TOO!



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Pushing Tools—San Juan Basin

PENETRATION RATES AND BITS

Size (in.)	No. bits	Footage	No. hours	Ft./hr.	Ft./bit	Hours on bot./bit
			Drilling			
9	1	200	8.0	200	25	8.0
8¾	15	2,905	217.0	193.7	13.3	14.5
6¼	26	1,595	268.3	61.3	5.9	10.3
4¾	4	790	57.3	197.5	13.8	14.3
			Reaming			
13¾	1	176	6.0	176	29.3	6.0

Mud additives . . . Bentonite, 72,200 lb.; Barite, 147,300 lb.; soda ash, 875 lb.; quebracho, 2,135 lb.; caustic, 570 lb.; fiber, 52 sacks, hulls, 16 sacks.

Drilling Comments and Discussion

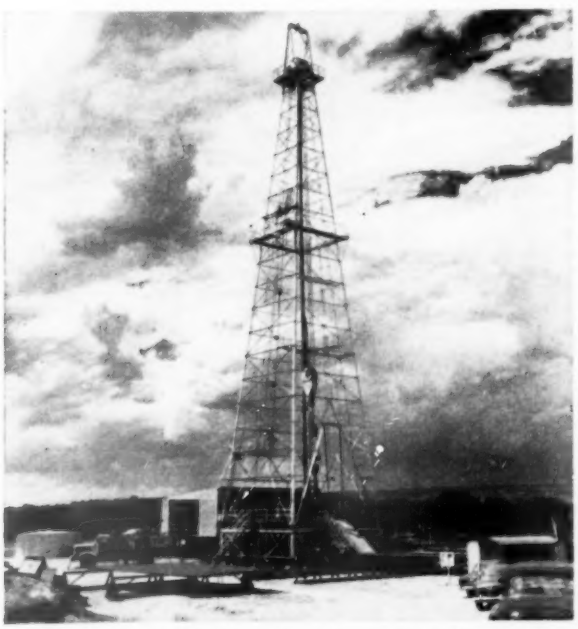
This analysis compares the following wells in the Blanco-La Plata area in the San Juan basin:

Well A—El Paso Natural Gas Co. 1-G Howell, 24-30n-8w.

Well B—El Paso Natural Gas Co. 2-H Howell, SW NE SW 14-30n-7w.

In addition to affording control in this major gas field, the data demonstrate drilling characteristics of using gas as a drilling medium. Gas drilling resulted in faster penetration rates than use of drilling mud; moreover, bit performance improved in spite of small-diameter bit sizes used. This is particularly noticeable in Well B where 6¼-in. bits were employed with conventional bentonite mud for the interval between 3,110 to 4,700 ft.; these bits averaged 61 ft. per bit with an average rate of 5.9 ft. per hour.

After commencement of gas drilling, bit size was changed over to 4¾-in. and an average penetration rate of 13.8 ft. per hour was experienced; bit performance averaged 197.5 ft. per bit. However, immediately after changing to gas, stuck-drill-pipe trouble was encountered and some junk was lost in the hole in Well A. These conditions distort the bit performance analysis; however, the last 6⅛-in. bit run made 390 ft. of hole. Penetration was faster in Well B possibly due to use of 8¾-in. rock bits to the top of the producing sand.



Drilling rig at a Phillips Petroleum Co. well near Glenrock, Wyo.

Here's a Hole

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Contractors Face Mixed Trends in Drilling Prices

Day work rates generally higher than a year ago while footage prices soften in many areas, Journal survey reveals.

MIXED price trends are reflected in the annual survey on rotary contract drilling prices conducted by The Oil and Gas Journal which reveals that day-work rates are generally higher than a year ago. This condition is due to increased wage levels, higher operating costs, and increased expense for equipment replacement and modernization.

On the other hand, footage prices have softened somewhat in many operating regions in the United States and Canada due to a surplus of drilling rigs despite a new record in exploratory drilling and a high level in development work.

The following analysis is a spot check of contract prices obtained from principal companies and contractors. In many cases, these represent the average of several contracts in a given field and in other cases are the average price taken from several sources.

Permian Basin

West Texas has not regained the boom status that prevailed while 700 rigs were working along the Spraberry trend. Today, Spraberry trend drilling is relatively insignificant in volume, and footage prices are written at $5.75 as compared to $6.00 per foot prevailing a year ago. Day-work rates are practically unchanged at $675 for 5 to 8 days of completion work at Spraberry. A major development is needed to absorb the surplus of both medium and deep-drilling rigs available in the Midland-Odessa area.

Footage prices have softened on both Permian and pre-Permian development in the basin. On Permian dolomite 5,100-ft. development in fields like Slaughter, footage prices are $3.50 as compared to $4.00 a year ago. On deep-reef development in Terry County, footage prices on 10,000-ft. jobs requiring 48 footage days are written as low as $7.00 compared to $8.50 a year ago in the same field.

PERMIAN BASIN

	Footage price	Contract depth	Day work rate	Total footage days	Days on day work
WEST TEXAS:					
Andrews County	9.50	10,600	1,100	75	20
Hulldale (Schleicher)	6.90	6,100	725	37	5
Midland Farms—Permian	3.00	5,000	575	10	5
Midland Farms—Mississippian	*8.25	13,500	850/950§	90	25
Midland Farms—Devonian	†9.25		900/1,000¶		
Midland Farms—Ellenburger	‡10.75		900/1,050		
Midland Farms—Ellenburger			900/1,100**		
Midland Farms—Ellenburger			925/1,150††		
Slaughter	3.50	5,100	575	9	3
Spraberry Trend	5.75	8,000	675	41	8
Sutton County	7.15	7,700	775	64	16
Terry County	7.00	10,000	775	48	5
Wellman	7.50	10,000	775	59	7

*To top of Mississippian or 11,875 ft. whichever is shallower. †To top of Devonian or 12,350 ft., whichever is shallower. ‡To top of Ellenburger. §From 0 to 10,000 ft. ¶From 10,000 to 11,000 ft. From 11,000 to 12,000 ft. **From 12,000 to 13,000 ft. ††From 13,000 to 14,000 ft.

NEW MEXICO:					
Caprock (Lea)	8.50	9,500	875	70	30
Denton (Lea)	8.00	9,000	850/950	60	120
Lea County†	*8.50	12,700	1,125	58	73
Echols (Lea)	9.25	11,800	900/1,050	99	5
McKee (Lea)	7.70	9,400	800/950	60	26

*To 9,500 ft.; day work from 9,500 ft. to total depth. †Contract contains chert and lost-circulation clauses.

MID-CONTINENT

OKLAHOMA:					
Springer Trend:					
Sholem-Alechem	5.75	5,800	725	35	1
Gotebo, Northeast (Kiowa)	10.75	6,500	725	60	5
Doyle (Stephens)	*7.25	7,900	†700	43	
Panther Creek, S.W. (Garvin)	5.35	8,500	‡600/700		
			§650/700		
Purdy (Garvin)	6.50	9,400	650/750		

*Oversize drill collars and oil-emulsion mud. †Plus 1½ cents per foot per day drill-pipe rental. ‡0 to 7,500 ft. §7,500 to 8,500 ft.

Southern Oklahoma:					
Township 3n-3w	5.50	8,000	575/675		
Township 3n-4w	6.50	9,500	700/800		
Township 6n-10w	3.00	3,500	400/450		
Township 2s-3w	5.75	6,000	575/650		
	4.50	5,000	600/700		
Township 2s-4w	3.75	4,100	550/625		
	3.00	2,700	360/360		
	4.00	4,900	500/550		
Township 3s-2w	5.50	6,000	550/620		
Township 6s-7e	12.00	4,000	400/500		
Other Areas:					
Beckham County	10.00	10,900	1,075	50	11
Bowden (Creek)	2.00	1,700	195/195	11	8
Cimarron County	6.50	5,000	600/700		
Garfield County	6.50	6,200	650	46	4
Greenough (Beaver)	6.25	5,900	600/700	39	23
Katie (Garvin)	5.50	7,600	650/750	42	16
Little Chief (Osage)	3.50	2,800	485		
Rich Valley, S.E. (Grant)	6.85	5,850	600/650	40	25
Searight (Seminole)	3.50	3,650	360/480	14	3
KANSAS:					
Ogallah (Trego)	3.25	4,600	500	10	2
Hugoton gas field	3.00	2,800	500	7	1
Rooks County	3.25	3,650	500		
Township 15s-13w (Russell)	3.25	3,300	288/384		
Township 15s-18w (Ellis)	3.25	3,600	450/500		
Township 20s-15w (Barton)	3.50	3,900	450/500		
Township 22s-14w (Stafford)	3.25	3,600	450/500		
Adams Ranch (Meade)	7.50	6,000	*700	40	5

*Plus 1½ cents per foot per day for drill-pipe rental.

Note: Under day-work rates, figure before diagonal is without drill pipe; after diagonal with drill pipe.

GULF COAST EMBAYMENT

	Footage price	Contract depth	Day work rate	Total footage days	Days on day work
SOUTH TEXAS:					
Beaumont, West (Jefferson)	3.75	5,950	650	21	7
Clinton (Harris)	3.00	4,100	550	11	7
Fulton Beach (Nueces) (barge)	4.95	7,200	1,250	16	9
Helen Gohlke (Goliad)	3.50	8,500	700/780		
Hull (Liberty)	4.00	9,300	750	30	10
Jefferson County	3.25	7,000	650/730		
Minoak (Bee)	4.25	8,600	850	36	14
New Ulm (Austin)	4.25	10,200	650	60	9
Red Fish Bay (barge)	6.25	8,000	1,400/1,500		
Riverside, East (Nueces)	3.10	5,000	500	11	7
Spindletop (Jefferson)	3.00	3,500	700	7	8
	3.20	5,000	700	10	10
SOUTH LOUISIANA:					
Branch, N.W. (Acadia)	5.00	11,450	750/800* 850/1,000†		
Bourg (Terrebonne)	5.25	12,800	950/1,050	34	30
Jeanerette (Iberia) wildcat	4.50	10,500	700/800	40	10
Assumption Parish	5.90	12,500	1,000/1,100	‡45	‡12
State Tract 1805 (water)	7.50	12,500	950/1,300	55	35

*For day work conducted above protection casing point (at 11,150 ft.). †For day work conducted below protection casing point (at 11,150 ft.). ‡Estimate.

ARK.-LA.-TEX.

ARKANSAS:					
Columbia County	7.20	9,000	700/775	57	8
Fouke (Miller)	3.00	3,550	500/525	18	12
LOUISIANA:					
Ada (Bienville-Webster)	4.20	5,150	500/550	23	17
Bossier County	5.20	7,600	700/750	37	28
Claiborne County	5.90	8,000	750	56	7
Union County	7.20	8,800	850	57	8
EAST TEXAS:					
East Texas field	1.35	3,600	450	5	0
Willow Springs (Gregg)	4.90	6,900	700	30	2
Woodlawn (Harrison)	4.60	7,000	615	30	2

ILLINOIS BASIN

ILLINOIS:					
Ellery, West	3.75	3,500	400	14	1
Loudon	3.25	1,400	350/400	5	6
Township 5n-8e	3.25	3,100	400		
Township 3s-9e	3.50	3,500	360/400		
INDIANA:					
Spencer	3.75	3,000	400	13	3
Township 6s-7w	3.50	1,500	300/360		

CALIFORNIA

SAN JOAQUIN VALLEY:					
Belgian anticline	8.00	7,000	1,020	25	4
Edison	6.75	6,400	960	27	3
Elk Hills, deep	7.00	7,200	1,020	32	5
Midway-Sunset	4.50	2,000	780	3	3
COASTAL REGION:					
Cat Canyon, deep	7.00	5,600	900	25	5
Cat Canyon, shallow	4.50	3,000	825	10	4
San Ardo	4.50	2,400	780	5	2
South Mountain	9.00	5,500	960	22	3
Torrey Canyon	12.00	10,000	1,140	55	7
Ventura Avenue, D-7	14.00	12,000	1,200	75	8
Ventura Avenue, D-5	10.50	9,000	1,080	50	5
LOS ANGELES BASIN:					
Aliso Canyon	10.00	8,500	975	40	7
Brea-Olinda	8.00	5,300	950	25	3
Long Beach	5.75	3,500	870	12	3
Placerita Canyon	4.50	2,000	750	5	2
Santa Fe Springs	6.50	7,800	1,020	22	4
Wilmington	4.75	3,800	870	14	3

(Continued on next page)

Mid-Continent

Springer trend . . . Footage and day-work prices along the Springer trend have shown some improvement over a year ago. In Sholem-Alechem field of Stephens County, Oklahoma, footage rates are about $5.75 as compared to $5.25 a year ago. In Panther Creek, Southwest, field of Garvin County, Oklahoma, footage rates range from $4.75 to $5.35 per foot on 7,700 to 8,500-ft. contracts respectively; and day-work rates are $650 without drill pipe to $750 with drill pipe.

Kansas . . . On the Central Kansas uplift, an extremely highly competitive situation has kept footage prices at a low level. Prevailing price over much of Ellis, Russell, Rooks, and Stafford counties appears to be $3.25 on 3,300 to 3,750-ft. contracts. Day-work rates vary from $350 to $450 without drill pipe to $400 to $500 with drill pipe.

In pre-Permian development in southwestern Kansas, footage rates are unchanged at $7.50 per foot on 6,000 ft. Mississippian projects and day-work rates are $700 per day including 1½ cents per foot per day for drill-pipe rental.

Gulf Coast

South Texas . . . Footage and day-work prices along the Texas Gulf Coast have softened appreciably during the past 12 months. On 10,500-ft. Eocene Wilcox sand contracts in New Ulm field of Austin County on the Wilcox trend, footage rates are down to $4.25 as compared to $4.50 a year ago. Pool wells require 60 days to drill.

On the same trend, 8,600-ft. contracts in the Minoak area of Bee County were let at $4.25 as compared to $4.50 a year ago on work requiring 36 footage days. Day work requiring 14 days is unchanged at $850. Clinton field in Harris County eased from $3.25 a year ago to $3.10 on 4,100-ft. contracts requiring 11 footage days; day-work rates are off $150 to $550.

Barge jobs in Fulton field of Nueces Bay are down to $4.95 per foot on 7,200-ft. contracts requiring 16 footage days as compared to $6.50 a year ago. Day-work rate is off $250 from a year ago and is now $1,250.

South Louisiana . . . Going footage price in Bourg field of Terrebonne Parish is now $5.25 as compared to $5.50 a year ago. The 12,800-ft. contract requires 34 days on footage. Day-work rates are generally within the range of a year ago.

An offshore contract, State Tract 1805, provides a going footage price of $7.50 on a 12,500-ft. contract requiring 55 days on footage. Day-work

ROCKY MOUNTAINS

	Footage price	Contract depth	Day work rate	Total footage days	Days on day work
BIG HORN BASIN:					
Sage Creek	6.00	3,500	700/750		
Township 49-93w	13.50	11,250	1,075	140	15
DENVER-JULESBURG BASIN:					
Colorado:					
Little Beaver (Adams)	3.25	5,150	600/650	10	4
Keota-Lyons (Weld)	6.00	8,500	750/800	40	5
Logan County	3.25	4,800	650/700	10	5
Nebraska:					
Cheyenne County	3.50	6,000	650/700	19	4
Western Kimball County	5.00	7,500	720/840	23	5
POWDER RIVER BASIN:					
Clareton, N.E. (Weston)	4.00	5,900	725/785	18	3
Meadow Creek (Johnson)	6.75	9,000	*920	40½	8
Sussex "A" Unit (Johnson)	7.50	9,000	*920	58	23
Salt Creek (Natrona)	4.00	2,600	625	10	2
UINTA BASIN:					
Willow Creek (Uintah) wildcat	11.75	5,500	*825		
WIND RIVER BASIN:					
Beaver Creek (Fremont)	10.35	11,950	900	95	40
Winkleman (Fremont)	6.25	3,300	625	17	1
WILLISTON BASIN:					
Nesson anticline:					
Williams County, N. Dakota		14,200	°950	60	
			†975		
			‡1,075		175
McKenzie County, N. Dakota	9.25	§12,000	¶1,050	57	25

*Plus 1½ cents per foot per day for drill-pipe rental.

*Plus 1½ cents per foot per day for drill-pipe rental.

*Day work to 10,000 ft. †Day work from 10,000 to 11,000 ft. ‡Day work from 11,000 to 14,000 ft. §Footage to 9,200 ft. ¶Day work from 9,200 to 12,000 ft.

WESTERN CANADA:					
Big Valley—Stettler	5.25	5,400	672/744		
Joseph Lake	3.15	3,300	674/720		
Pidgeon Lake	†6.75	*7,300	800/850		

*To top of D-2 zone. †Contractor furnishes own water and fuel.

rate without drill pipe is $950, and $1,300 with drill pipe; about 35 days are utilized on day work.

California

Compared to a year ago at this time, footage rates in California fields are about the same but day rates are up. One factor in the higher day rate is an increase in wage costs of about $30 per day per rig. Footage rates were not increased because of increased penetration rates.

All heavy-duty rigs in California are busy. However, some light rigs, principally in the 4,000-5,000-ft. classification, are stacked. This condition is causing some shaving of footage prices in shallow areas.

Rocky Mountains

Williston basin . . . Heretofore, nearly all drilling on the Nesson anticline was contracted on a day-work basis. However, footage prices of $9.25 are now being written into contracts for developmental wells on the Nesson anticline of North Dakota.

Powder River basin . . . Contracts for development work in the rig concentration in the Clareton area of Weston County are being written at $4.00 on 5,800 to 6,000-ft. jobs which require 18 days to contract depth.

On the southwest flank of this basin, Pennsylvanian Tensleep sand development is being conducted at Meadow Creek and Sussex "A" unit. Footage prices on these 9,000-ft. contracts range from $6.50 to $7.00 at Meadow Creek and $7.50 at Sussex.

Denver-Julesburg basin . . . A total of 72 rotary rigs owned by 44 contractors are in the Denver-Julesburg basin at this time but only 55 rigs are active. Footage prices have dropped to $3.25 per foot on single-well contracts and some contracts have been written for as low as $3.00 per foot on multiple-well contracts. However, contractors have been able to make fast drilling time in Cretaceous shales, particularly in the Huntsman, Dorman, and Doran areas of Cheyenne County, Nebraska. In the deeper parts of the basin, footage prices in western Kimball County on 7,500-ft. jobs to the Cretaceous Muddy sand are written at $5.00 and in the deep search for Permian Lyons sand in the Keota and nearby areas of Weld County, Colorado, footage prices are reported at $6.00.

Drilling Costs Distribution

Experience of one strong independent oil company is cited herewith to illustrate distribution of various drilling costs throughout operating regions of the United States.

	Per cent			
Region—	A	B	C	D
Kansas	86	6	6	2
Illinois basin	82	12	4	2
North, West Texas	80	12	6	2
Oklahoma	67	21	7	5
West Texas, New Mexico	63	25	6	6
South Texas	59	25	13	3
South Louisiana	29	45	20	6
	—	—	—	—
Over-all company position	64	24	8	4

A—contract drilling; B—day-work costs; C—drilling-mud costs; D—miscellaneous contractor costs.

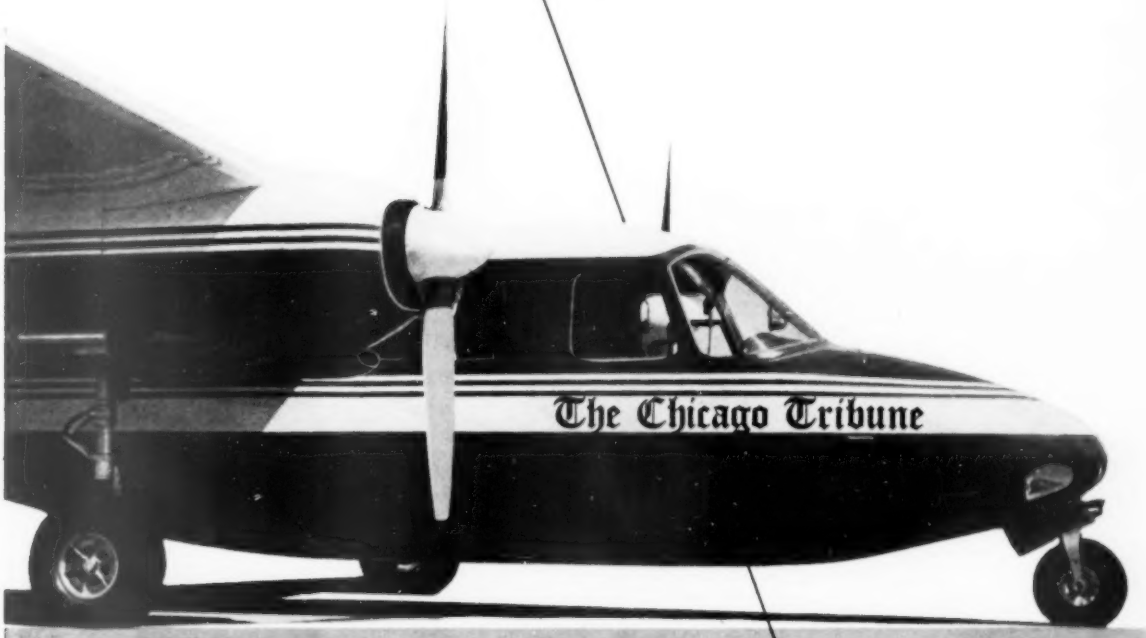
NOMENCLATURE: SPECIAL PROVISIONS

Chert clause . . . "In the event chert is encountered, and there has been a run of 72 consecutive hours in such formation, if the contract price for the footage drilled during the 72-hour period does not equal the amount at the prevailing day rate, then the well is to go on a day-rate basis, with operator furnishing the rock bits, until drilling through the formation has been completed. Thereafter, when chert is encountered, drilling is to be on a day-rate basis until drilling of such formation is completed; provided always that operator has the right to discontinue drilling at any time."

Lost-circulation clause . . . "In event of loss of circulation due to the nature of the formation and not contributed to by acts or equipment of contractor, contractor shall be paid applicable day-work rates after the first 24 hours until circulation is regained and operator's drilling operations can be resumed for a reasonable length of time. Free time furnished by contractor under this provision shall be limited to a total of 72 hours."

High-pressure-conditions clause . . . "In the event of heaving shale or excessive gas pressures and high-pressure water flows, contractor shall promptly notify operator of such conditions, and in event contractor cannot overcome such conditions within 48 hours by exercising due diligence, then contractor having up to that point performed and discharged all its occurred obligations hereunder, he shall be paid at the day rates herein provided for."

a nose for business



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JOURNAL'S FOURTH ANNUAL CENSUS OF ROTARY DRILLING REVEALS

60,000 Employes, 1,146 Companies in U.S.

NEARLY 60,000 employes are on the payrolls of 1,146 rotary drilling companies in the United States, the fourth annual census of The Oil and Gas Journal reveals.

These contractors own 3,608 rigs, of which 3,033 were in operation at the time the 1953 census count was made. These operating rigs average 3.15 rigs per contractor which means that there are many hundreds of small contractors active in the American rotary-drilling industry.

Personnel distribution . . . More than three-fourths of rotary drilling personnel are drillers and rig helpers who total 45,545 (when the 3,033 rigs were running) for 76.13 per cent of total. Ownership group of executives and partners make up 2,397 or 4 per cent of total, the census reveals. Field superintendents and tool pushers account for 2,875, or 4.80 per cent. In addition, 9,013 office workers and others are gainfully employed by the contracting industry. This group comprises 15.07 per cent. These figures add up to a total of 59,830 employes on the payrolls of the rotary-drilling companies.

Concentrated in Southwest . . . Home offices of the American drilling contractors are concentrated in four states in the Southwest; these four states account for 865 contractors owning 2,884 rigs. Texas leads with 511 contractors and 1,635 rigs. Oklahoma follows with 195 contractors and 838 rigs. Kansas has 105 contractors and 212 rigs, and Louisiana 54 contractors and 199 rigs. California has 70 contractors with 226 rigs, and Illinois has 68 contractors with 131 rigs.

Nerve centers . . . Tulsa leads the nation in concentration of home-office control for rig ownership and 73 Tulsa contractors own 493 rigs. In the Fort Worth-Dallas area, there are 69 contractors operating 305 rigs while Houston has 75 contractors with 304 rigs.

The Journal analysis also revealed that 87.4 per cent of the drilling contractors own and operate oil and gas wells. Producing operations of more than one-half of these contractor-producers are more important than their contract-drilling activities.

Where Are the Home Offices of the 1,146 Contractors Who Own 3,608 Rigs Located?

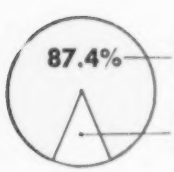
CALIFORNIA	70 Contractors own	226 Rigs
ILLINOIS	68 Contractors own	131 Rigs
KANSAS	105 Contractors own	212 Rigs
OKLAHOMA	195 Contractors own	838 Rigs
LOUISIANA	54 Contractors own	199 Rigs
TEXAS	511 Contractors own	1,635 Rigs
OTHERS	143 Contractors own	367 Rigs

Where Is Concentration of HOME OFFICE CONTROL for Rigs Owned?

63 contractors 212 rigs . . . . . WICHITA
73 contractors 493 rigs . . . . . TULSA
53 contractors 177 rigs . . OKLAHOMA CITY
44 contractors 170 rigs
LOS ANGELES - LONG BEACH
50 contractors 201 rigs . MIDLAND - ODESSA
WICHITA FALLS . . . 74 contractors 205 rigs
FT. WORTH-DALLAS . 69 contractors 305 rigs
SHREVEPORT . . . . 34 contractors 126 rigs
HOUSTON . . . . . 76 contractors 304 rigs
OTHERS . . . . . 610 contractors 1415 rigs

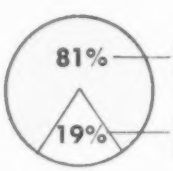
Where Were the 2,875 Superintendents and Tool Pushers Located Who Were Supervising 3,033 Rigs at Time This Census Was Made?

WEST TEXAS - NEW MEXICO	543 toolpushers	18.9%
TEXAS GULF COAST	422 toolpushers	14.7%
OKLAHOMA	374 toolpushers	13.0%
LOUISIANA GULF COAST	247 toolpushers	8.6%
ROCKY MOUNTAIN	218 toolpushers	7.6%
CALIFORNIA	196 toolpushers	6.8%



87.4% contractors also own and operate oil and gas wells

12.6% of contractors have no oil or gas wells



81% rotary rigs operated by contractors

19% rotary rigs operated by oil companies

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For medium rigs and average depths, specify me – **Type "B."**

I'm **Type "AAX"** and ready to tackle any rotary work, but if you are using the largest and tightest drill collars, then meet my big brother . . .

I'm the world's strongest tong!

They call me **"H"** for "Husky" because I ate my Manganese and Molybdenum and grew up to be big and strong. I love to wrap around large tight drill collars and make 'em holler "uncle."

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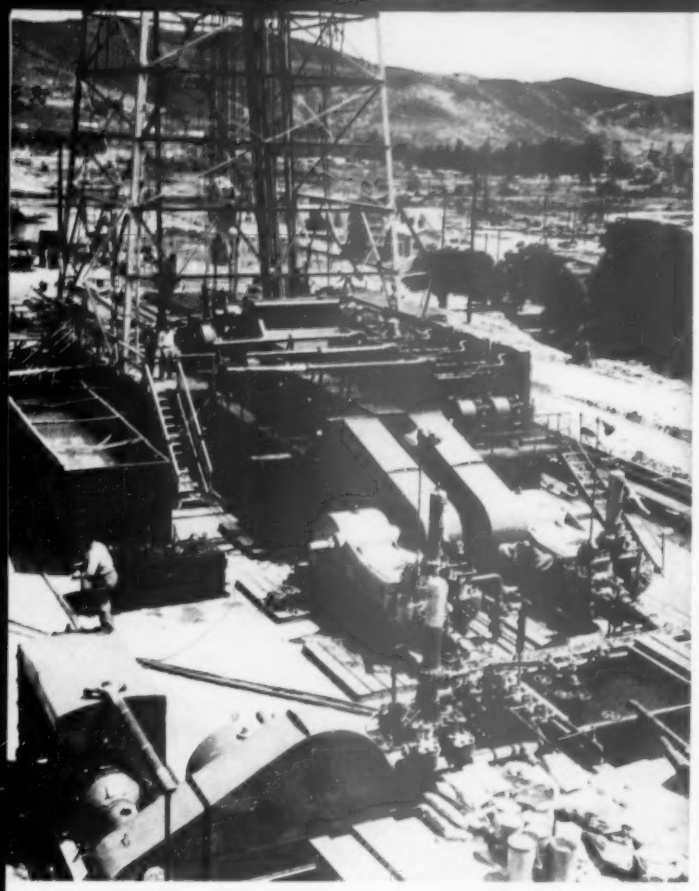


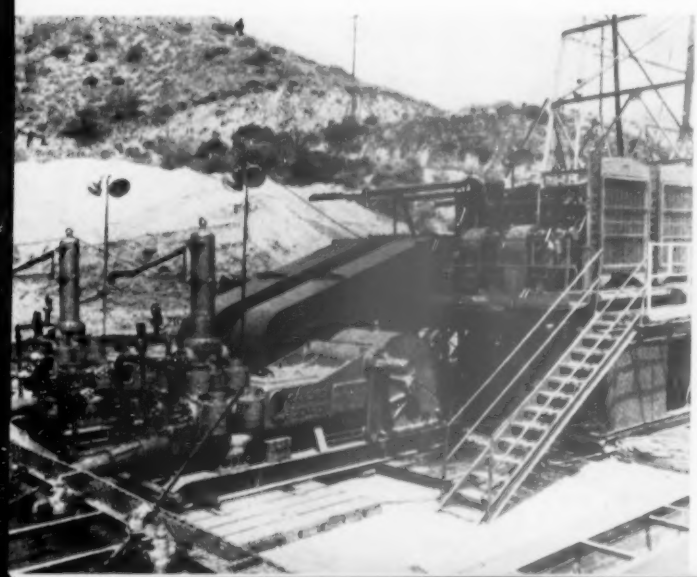
San Joaquin Drilling Co. rig in Ventura Avenue field of California, above and below. Photograph was taken while the rig was on its first well; it is now drilling on the second. Rated rig capacity is 2,250 hp. Drilling limits are 25,000 ft. with 3½-in. drill pipe, and 22,000 ft. with 4½-in. pipe.

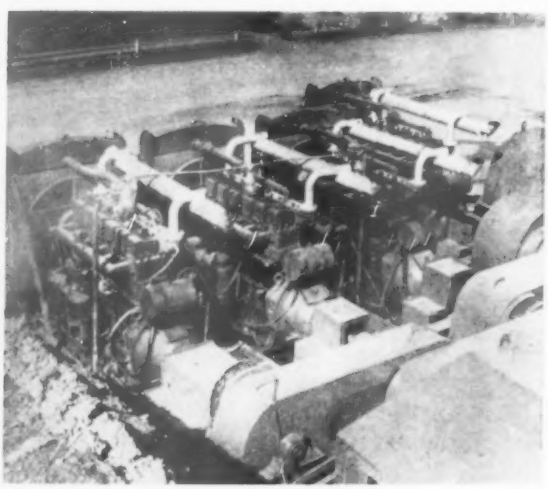
Discovery of a new deeper pool on the southeast flank of San Miguelito, which in reality represents an extension of Ventura Avenue's D-6 zone, has caused an extensive drilling flurry where the two fields meet. Rig in foreground is on a San Miguelito well for Continental Oil Co. while those in background are Shell Oil Co. wells in Ventura Avenue. In this vicinity 13 rigs are at work within 1 sq. mile.

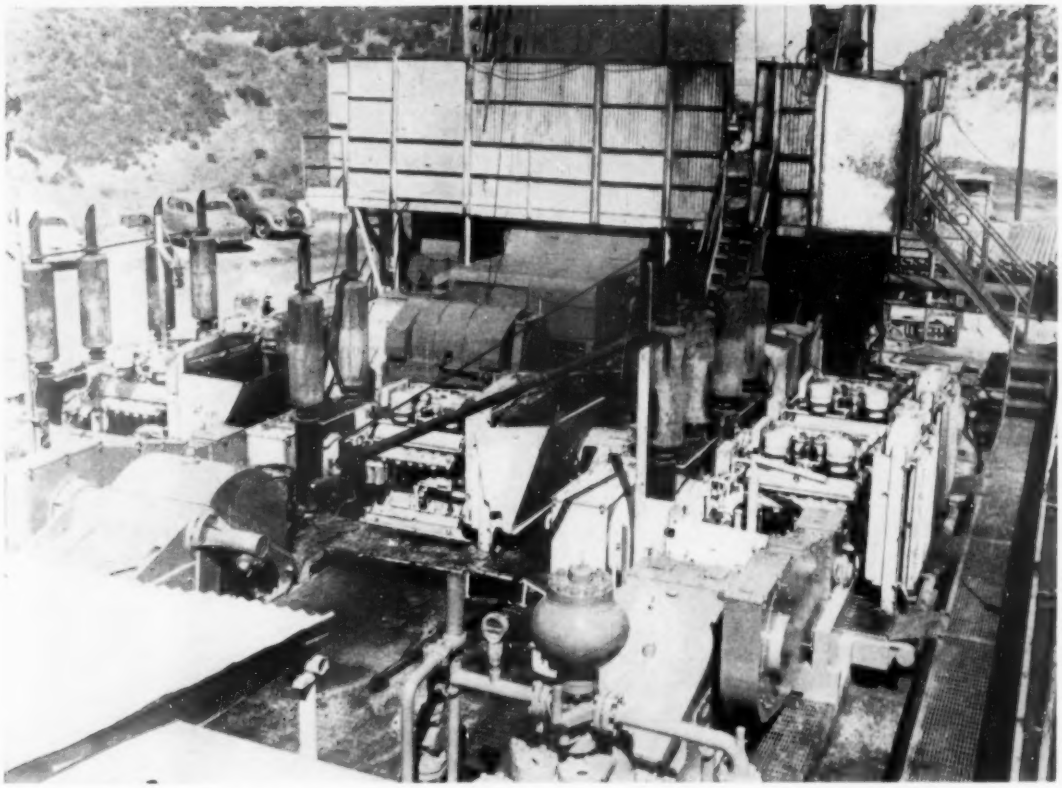
CALIFORNIA DRILLING . . .

Here are some of the big rigs

Rocky Mountain Drilling Co., Los Angeles, has been one of the leading California exponents for increased horsepower increases on mud pumps among California drilling contractors. Of its heavy rigs in the Ventura Avenue field, most now are equipped with eight engines, four drilling engines and four compounded to drive a 750-hp. mud pump. Photo is of a twin-well drilling island in San Miguelito, adjacent to Ventura Avenue, on a Continental Oil Co. well.

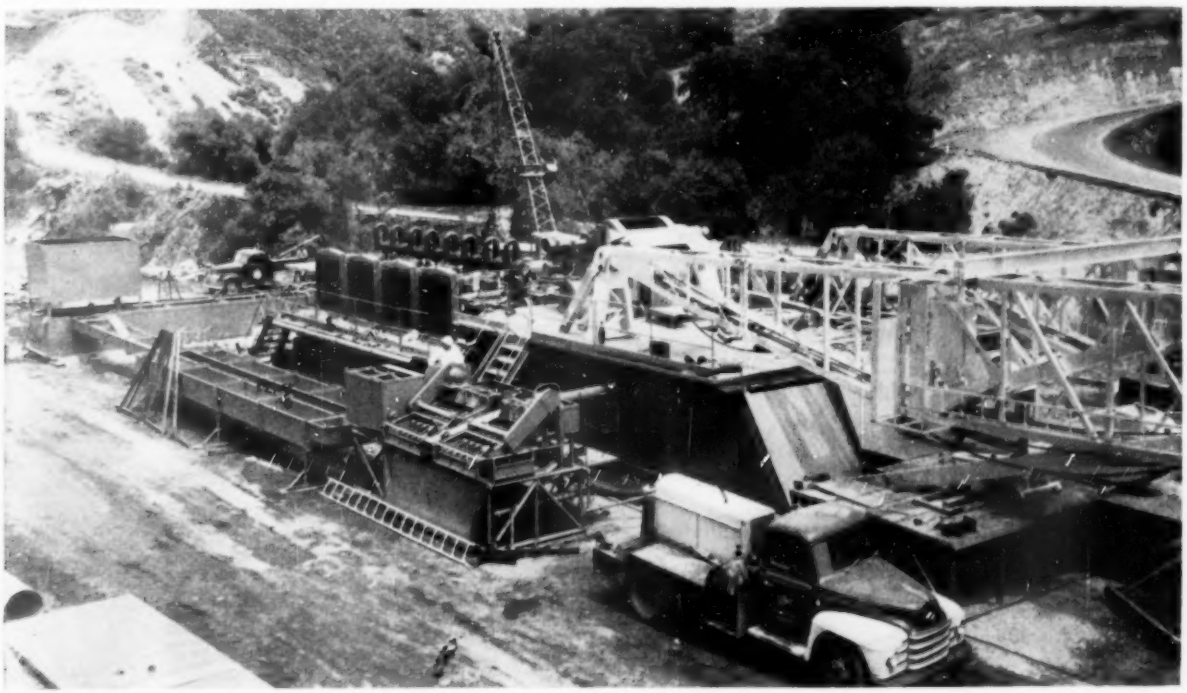






One of the fastest rigs in Ventura Avenue field is this 1,500-hp. rig of Shell Oil Co. The first three 12,000 to 14,000-ft. holes it drilled rank among the five fastest drilled to comparable depths. The rig is highly flexible; all five engines can be put on the draw works, or the four flank engines can be put on either pump. Drives from the engine compounds to the pumps and into the main drive-shaft are all universal couplings. This feature, as well as others, makes it possible for the rig to be readily assembled and torn down when moving to a new location.

Bell & Burden, Inc., a Los Angeles contract-drilling firm, is here rigging up a new rig in Ventura Avenue field. The rig with four-engine compound is capable of drilling below 16,000 ft. The rig has been unitized by Bell & Burden to facilitate moves. Draw works, engines, and engine drives are skid mounted and can be loaded out in four truck loads for short moves in the fields. For longer moves, skids can be completely removed. Most of the piping around the derrick is built into the substructure and the skids. Only the outside piping need be disconnected for a move. Rigging time is therefore kept to a minimum.



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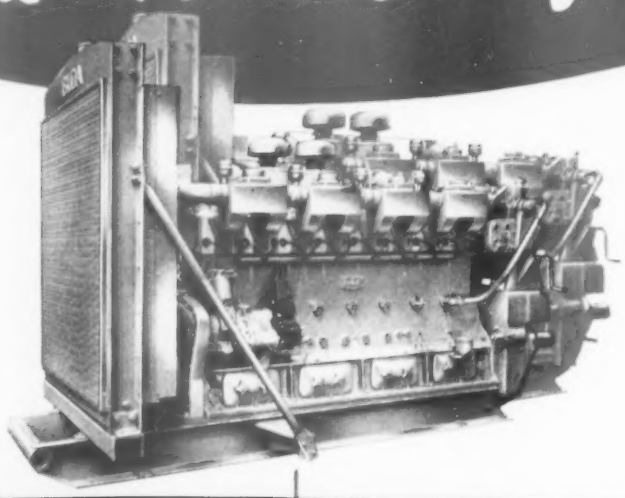

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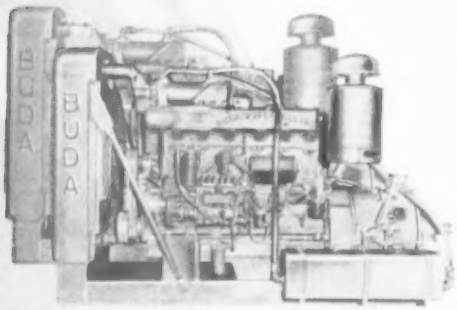

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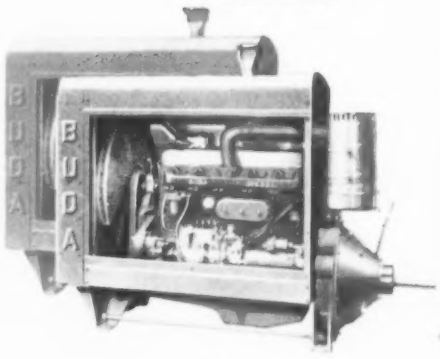
High Speed Engines Diesel or Gas



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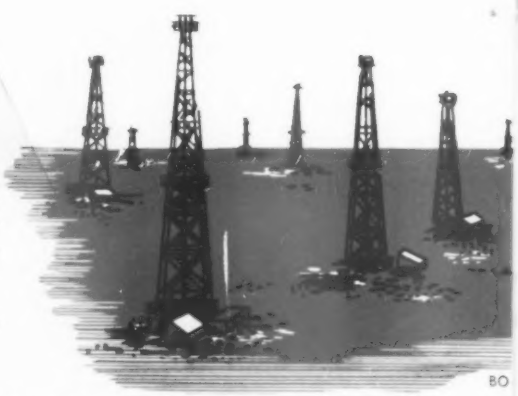

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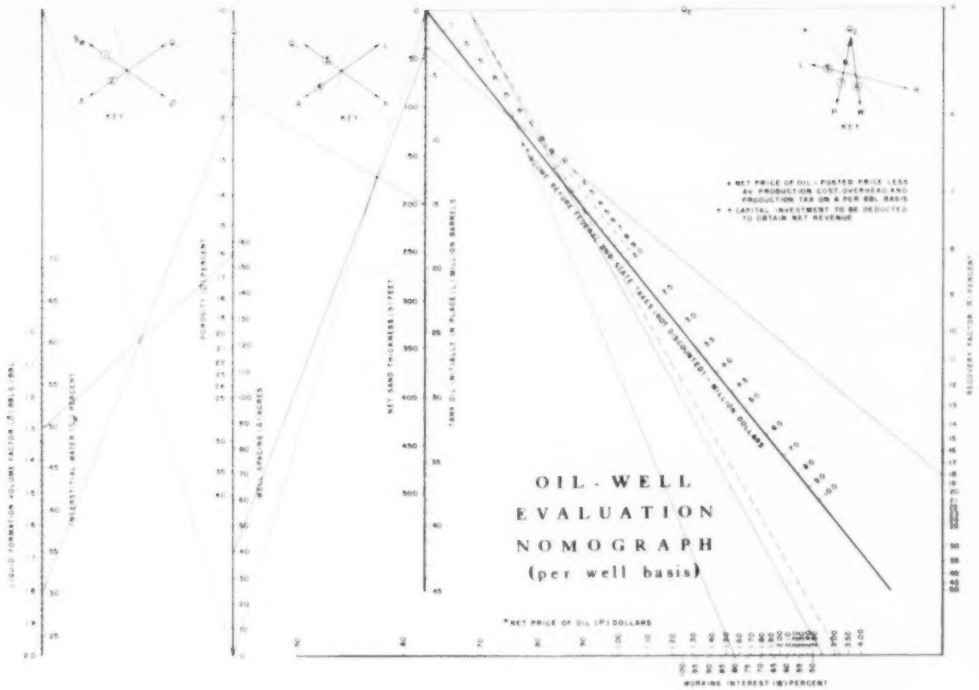


How to Use the Oil-Well Evaluation Nomograph

THE accompanying oil-well evaluation nomograph was designed to determine the effect of the various variables on the economics of producing deep wells. The following problem is solved using the nomograph. It illustrates a means of determining the feasibility of producing oil from a depth of 15,000 ft.

Problem . . . To determine the net income on a per well basis for an oil reservoir occurring at a depth of 15,000 ft.

DATA AVAILABLE OR ASSUMED

Cost of development well	$479,000
Oil gravity, °A.P.I.	38
Net price of oil, $3.28 per bbl. less operating cost of $0.50 per bbl.	$2.78
Net productive oil sand, ft.	200
Well spacing, acres	40
Liquid formation volume factor	1.8
Water saturation, per cent	50
Porosity, per cent	16
Recovery factor, per cent	18
Working interest, per cent	80

Solution . . . The problem is readily solved on the nomograph by following the solid red lines from key (1) to key (7). The dotted red line shows the gross revenue after royalty but before any other deductions.

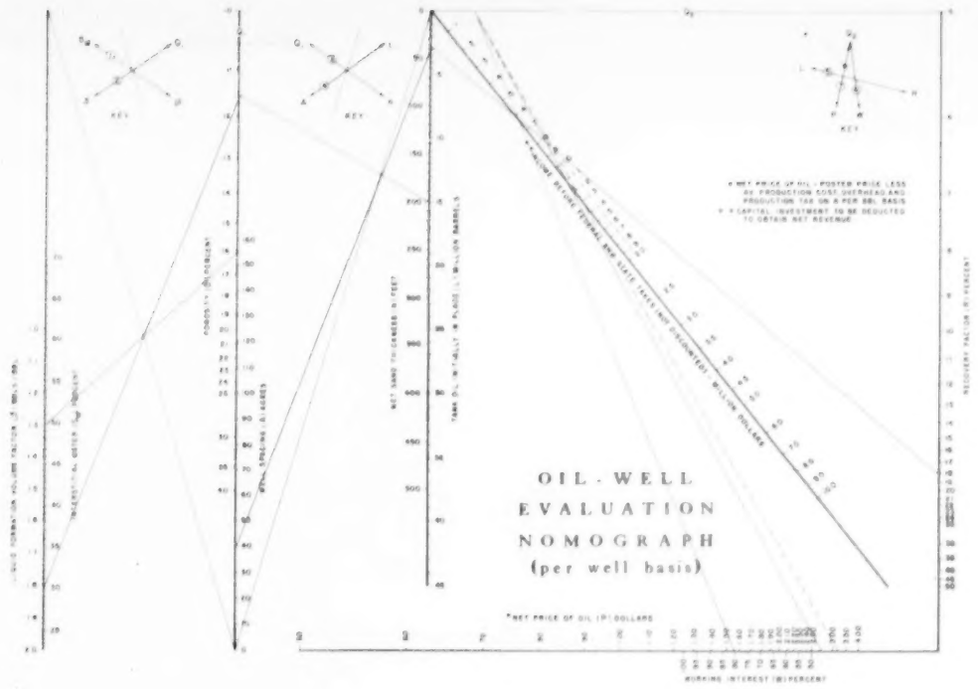
The results indicate a gross income from the oil production of $1,300,000 before operating expenses and $1,100,000 after operating expenses, both values before present worth and drilling costs and before federal and state taxes.

On the basis of a total corporation tax of 50 per cent, it can be assumed that the income tax on the basis of the gross working interest income will range between 20 and 30 per cent. Assuming an average of 25 per cent of the $1,300,000 as income tax, then the gross income after operating expenses of $1,100,000 would be reduced to $775,000. Discounting this net income after taxes at 6 per cent compounded annually and assuming a 10 per cent per year decline in the oil production for a period of 20 years, the $775,000 would be reduced further to $775,000 × *0.685 = $531,000.

Therefore, the results in this particular problem show that after deducting the drilling cost of $479,000, little or no profit can be expected from the oil production. The only profit to the operator would therefore have to come from the gas revenue, which would amount to a net present worth value after taxes of between $100,000 and $200,000.

The results of this problem demonstrate that even though 200 ft. of productive oil sand producing 38° A.P.I. crude is discovered, there should be a well spacing of well over 40 acres for an operator to receive a reasonable net profit over a 20-year period.

*Average present worth factor of future net income after taxes from the oil, and assume that the net income after taxes follows the decline in the oil production



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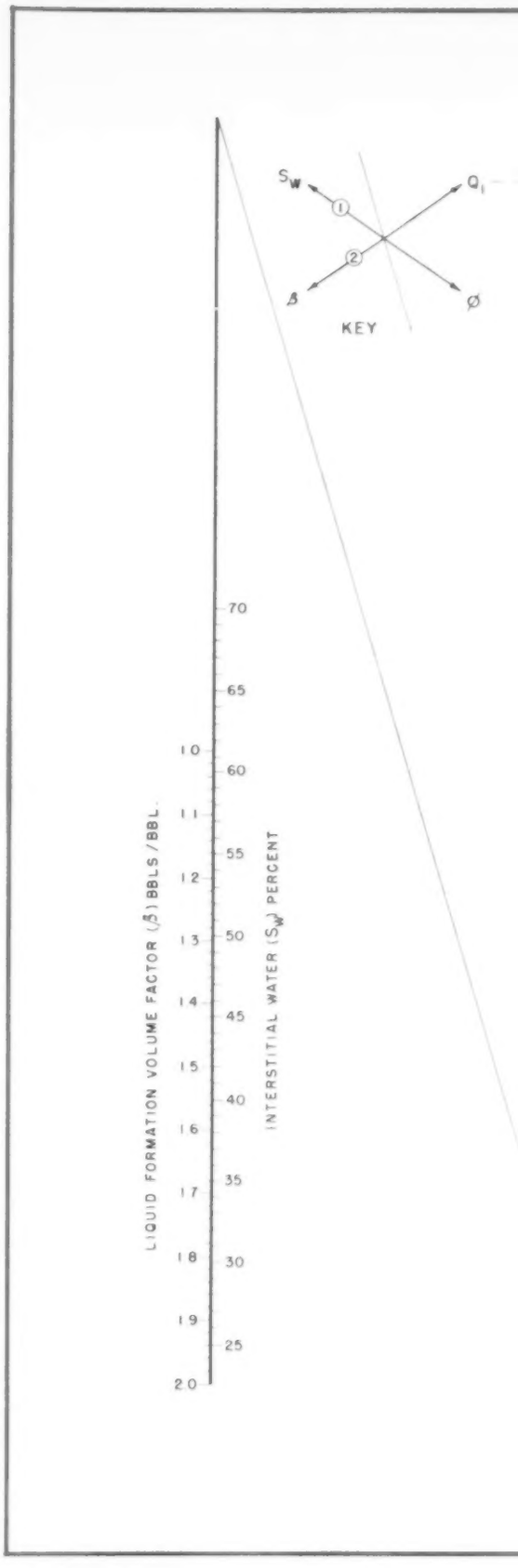
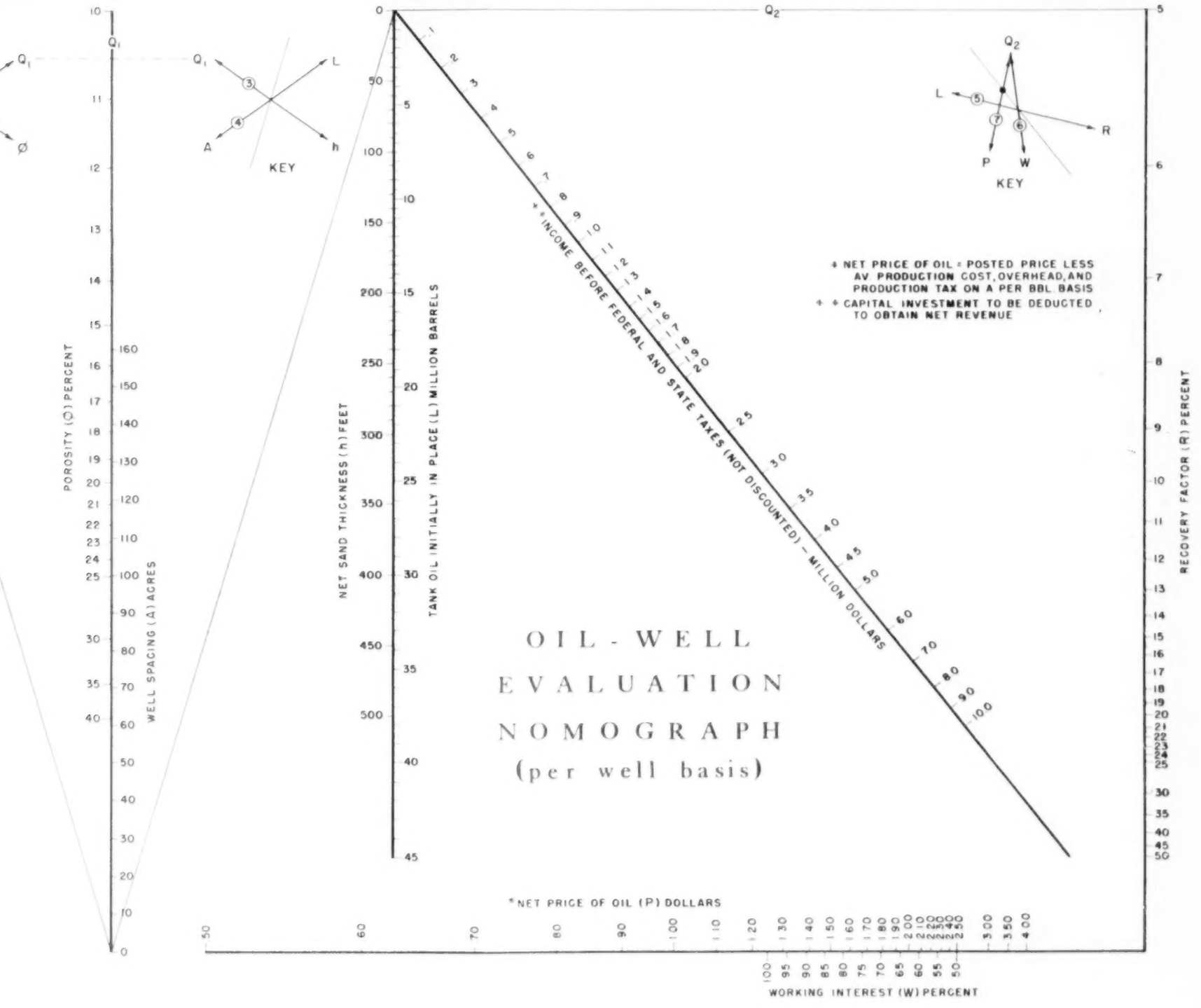



OIL - WELL
EVALUATION
NOMOGRAPH
(per well basis)
POROSITY (Ø) PERCENT
WELL SPACING (A) ACRES
NET SAND THICKNESS (h) FEET
TANK OIL INITIALLY IN PLACE (L) MILLION BARRELS
**INCOME BEFORE FEDERAL AND STATE TAXES (NOT DISCOUNTED) – MILLION DOLLARS
RECOVERY FACTOR (R) PERCENT
*NET PRICE OF OIL (P) DOLLARS
WORKING INTEREST (W) PERCENT
KEY
A
h
L
P
W
R
* NET PRICE OF OIL = POSTED PRICE LESS AV. PRODUCTION COST, OVERHEAD, AND PRODUCTION TAX ON A PER BBL. BASIS
** CAPITAL INVESTMENT TO BE DEDUCTED TO OBTAIN NET REVENUE

How Deep Is it Economic to Prospect? Find out from

Introduction

HOW much net oil sand and what well spacing would be necessary to pay out the cost of drilling deep oil wells below 15,000 ft.? Is deep oil prospecting, for example, economic in California?

Today the oil industry is confronted by these questions and many more—the answers to which are becoming more and more important as deeper horizons are sought in the endeavor to find new oil pools.

With the advent of deeper drilling, the exploration and exploitation departments of oil companies must work closer together, because in prospecting for oil in deeper horizons the object is no longer just one of finding oil. The object also is one of knowing whether there is enough oil to pay out the high drilling costs.

Well spacing is an extremely critical factor at these greater depths relative to economics. No longer can an operator expect a profitable venture in finding 50 ft. of good oil sand under a 20-acre spacing commitment, if it is necessary to go to 15,000 ft. to get the oil. Just how much oil sand must be found and what well spacing is necessary to return a profit to the operator in deep well drilling, are two important questions that this report will attempt to answer.

There are many variables that affect the oil recovery and the economics of an oil venture. In order to show quickly these variables and the effect they have upon oil recovery and economics, a single continuous evaluation nomograph was designed and is presented in this report. Using this nomograph, two sample calculations are presented to show the effects of the variables and the ease in determining the net income from the oil, before discounting and drilling costs and before federal and state taxes.

Although the primary purpose of this report is to present a method by the use of which the effects of the important variables on oil recovery and economics can be determined, other results are also obtained. A curve is presented to show the effect that depth has upon the porosity, which is one of the factors directly influencing the amount of oil in the reservoir. This curve was obtained from data on 71 oil reservoirs in California.

Drilling costs taken from published data are also presented to show the average drilling costs of deep oil wells in the United States.

The results of this study show that in deep oil prospecting great precaution must be taken by an operator before agreeing to a lease commitment on the density of the well spacing.

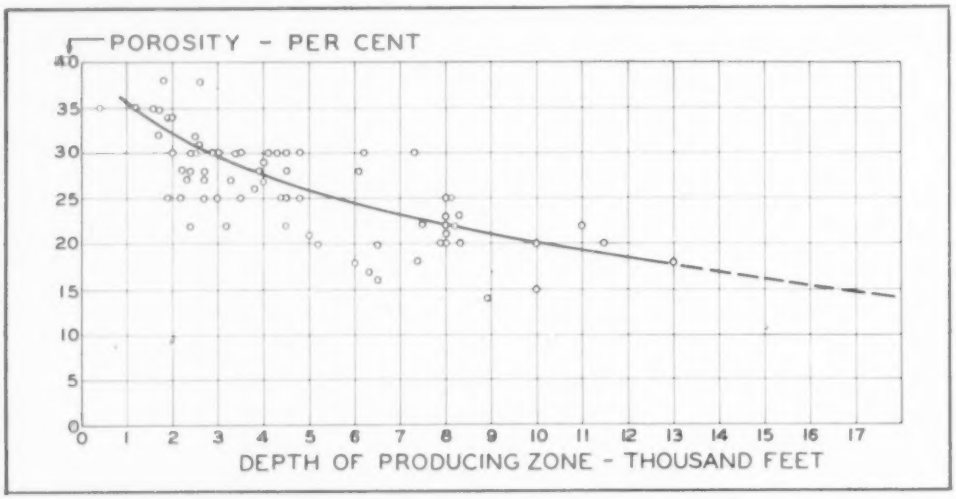
Deep Oil Prospecting in California

General . . . What are the chances in deep oil prospecting of finding oil in sufficient quantities to pay out the high well costs and return a reasonable profit to the operator? The answer to this question is an important one confronting the oil industry today, because the trend is toward deeper and deeper drilling in the search for oil, as evidenced by the increasing number of wells drilled over 12,500 ft.

During 1952, 341 wells were drilled below 12,500 ft. in the United States, with 10 of these going below 15,000 ft. To January 1953, there have been nine wells in California drilled to depths exceeding 15,000 ft. Only one of these, however, was successful to the point of showing a possible payout.

There are several factors that determine whether or not a deep oil reservoir will be economically attractive. Two important variables that must be considered relative to a deep-well drilling program are the amount of productive oil sand, and the density of the well spacing necessary to return a profit to the operator.

These variables and others can quickly be determined by the use of an evaluation nomograph de-



New Type Oil-Well Evaluation Nomograph

by H. K. Grant

signed specifically for this study. This nomograph, however, is not limited to deep oil reservoirs, but can be used to determine the economics for shallow reservoirs.

The final answer on the nomograph is expressed as net income from the oil production after royalty but before discounting and drilling costs and before federal and state taxes. The amount of reduction in the income after discounting and taxes varies to some extent between operators and, therefore, is left open to allow for computing to any desired condition. Revenue from gas production was not considered because it is felt that if an oil venture will not pay out on the basis of the oil production alone, it would not be too attractive. This, of course, excludes the condensate type of reservoir, which is a study in itself.

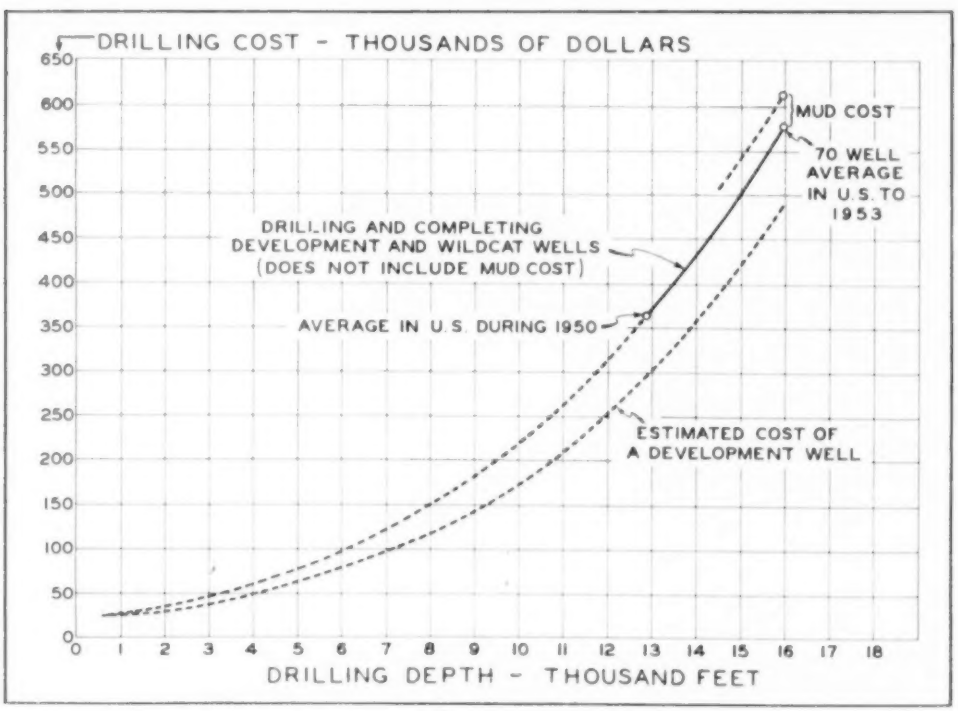
Effect of Depth Upon Oil Reserves

The most discouraging thing about drilling deep for oil production is the fact that per foot of productive oil sand, the reservoir volume available for hydrocarbons usually gets smaller with depth. This results because the trend is a decrease in the porosity and increase in the per cent connate water.

Fig. 1 is presented to show how the porosity decreases with depth. The data used for this curve were obtained from material published on 71 California oil pools. From this curve it can be seen that the average porosity that can be expected at a depth of 15,000 ft. is about 16 per cent. Unfortunately, there were not sufficient data to construct a curve to show the increase in the per cent connate water with depth for California oil pools. However, it is reasonable to expect that the per cent connate water at 15,000 ft. would be about 50 per cent. These two factors indicate that at 15,000 ft. one can expect only about 8 per cent of the bulk sand volume to contain hydrocarbons.

Assuming that these two factors can be approximated for deep zones, it is only necessary to know the liquid formation-volume factor, recovery factor, and amount of oil sand to be able to determine the amount of tank oil in the reservoir per unit of area. The

Howard K. Grant is reservoir engineer with Western Gulf Oil Co., in which capacity he has been serving since 1947. He was graduated from University of Southern California in 1942 with a B.E. degree in petroleum engineering. After graduating, he volunteered for active duty in the U. S. Naval Reserve, where he served over 4 years as an engineering officer. In 1946 he joined General Petroleum Corp. as an engineering trainee.



See opposite side of sheet for nomograph and example of use

liquid formation-volume factor for the type of oil that might be discovered at 15,000 ft. can be assumed to range between 1.6 and 2.0 reservoir barrels per barrel of tank oil for oil gravities ranging between 35° and 40° A.P.I. The recovery factor for oil at a depth of 15,000 ft. can be reasonably assumed to be quite low, in the range of 15 to 20 per cent under a flowing life.

The amount of sand section is one factor that cannot be assumed with any degree of accuracy, except possibly in certain areas where the regional geology might give some indication of the amount of sand to be expected at a certain depth. One of the two problems in the report is to solve for this variable, assuming a certain return to the operators on a well basis.

Cost of Drilling Deep Wells

The average cost of a 15,000-ft. well was obtained from published data on the drilling cost of 70 wells drilled in the United States to January 1953 below 15,000 ft. The average cost was $609,000 for an average depth of 15,994 ft. Forty-eight of the 70 wells were wildcat wells. Since the average cost of $609,000 included both wildcat and development wells, it is assumed that for a development well this cost can be reduced 20 per cent, which results in an average cost of $487,000 at an average depth of 15,994 ft.

Fig. 2 is presented to show how rapidly the drilling costs go up with depth. This curve assumes that the total drilling and completion costs have not changed appreciably from year to year, relative to depth. The curve shows that a development well at 15,000 ft. would cost about $420,000. Assuming a 10-well development program with the first well costing $540,000 and 10 per cent of the development wells not being commercial wells, the average cost per development well would be equal to:

$$\frac{\$420{,}000}{0.9} + \frac{\$540{,}000 - \$420{,}000}{10} = \$479{,}000$$

Second problem . . . (See opposite side of sheet for solution of first illustrative problem.) Determine how much productive oil sand must be found to return a net profit per well from the oil production of $400,000 present worth discounted at 6 per cent compounded annually and after taxes, assuming a 40-acre spacing program.

Data Available or Assumed

Same physical factors as in previous problem.

The solution to this problem is similarly worked out on the Nomograph, and is obtained by starting at key (7). To work the problem, the net income from the oil before discounting and drilling cost and before federal and state taxes is obtained by the following equation:

[Oil Revenue After Royalty (deducting only operating costs) × *0.70] × †0.685 — $479,000 = $400,000

*Assumes 30 per cent of gross income (deducting only operating costs) as income tax.

†Average present worth factor of future net income after taxes.

Oil Revenue After Royalty and Operation Costs

$$= \frac{\$400{,}000 + \$479{,}000}{0.685 \times 0.70} = \$1{,}833{,}000$$

The results of this problem show that under a 40-acre spacing program it would be necessary to discover 330 ft. of productive oil sand to return a profit to the operator of $400,000 per well from the oil production. An 80-acre well-spacing program, however, will only require a productive sand section of about half of the 330 ft., or 165 ft., to show a reasonable profit from the oil.

Conclusions

The results of the two problems given in this report demonstrate how important it is to consider the well spacing and productive sand thickness in prospecting for deep oil reserves. From the foregoing data, it appears that a reasonable profit can be made from a 15,000-ft. oil reservoir in California only if wide spacing is used or a large productive sand section is discovered. It is very important that the operator make no lease commitments on well spacing less than 80 acres unless more than 150 ft. of productive oil sand is fairly certain.

It is not intended that the results of this report prove or disprove the possibility of obtaining a reasonable profit from an oil reservoir at a drilling depth of 15,000 ft., but the writer does hope to emphasize that not only does the cost of drilling increase rapidly with depth, but that for a given type of crude, the recovery factor and volume of oil contained in a foot of productive sand might easily decrease to the point where the economics show little or no profit.

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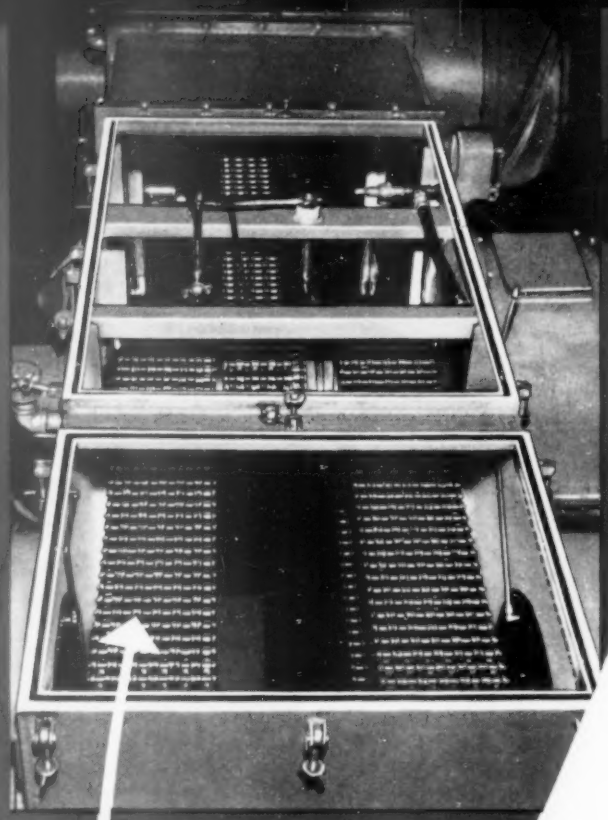

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One major reason for this outstanding performance is the uncompromising selection of leading, proven, quality components that lend credit to the Wilson equipment of which they are a part.

Diamond Roller Chains have been first choice on Wilson equipment since their first chain drive transmission drilling rig went into service. They deliver the smooth, long life, economical service that Wilson demands.

Because of their high uniform quality, improved wear resistance and greater strength, Diamond Chains provide the matchless dependability oil men must have for profitable drilling.

DIAMOND CHAIN COMPANY, Inc.

Where High Quality is Traditional

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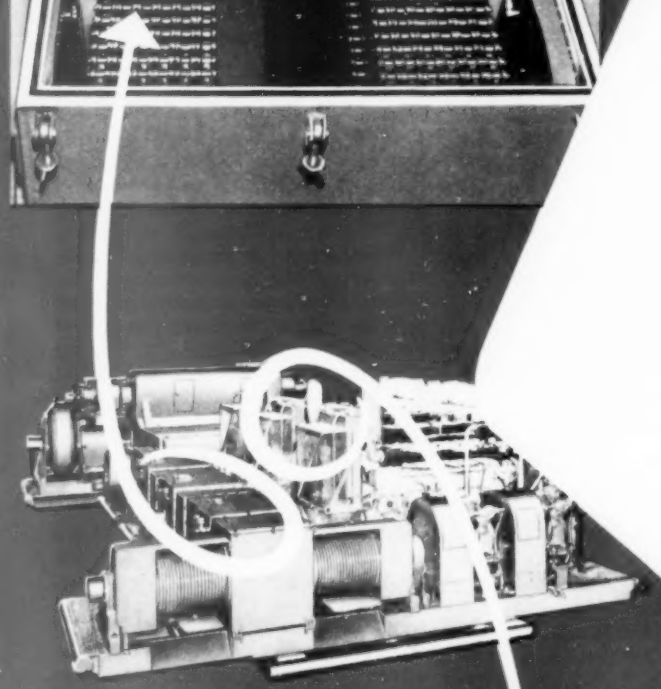
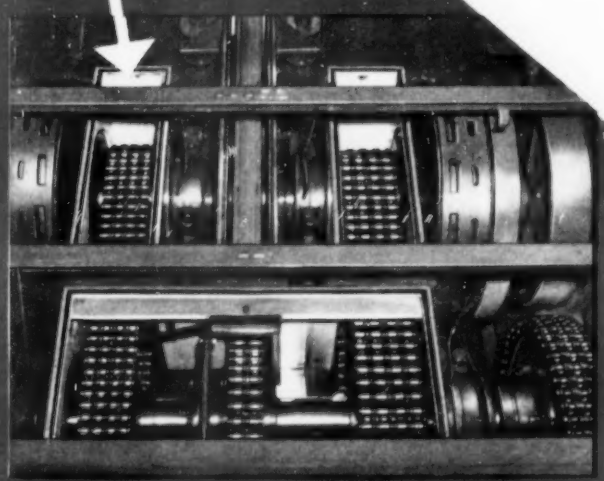
Offices and Distributors in All Principal Cities

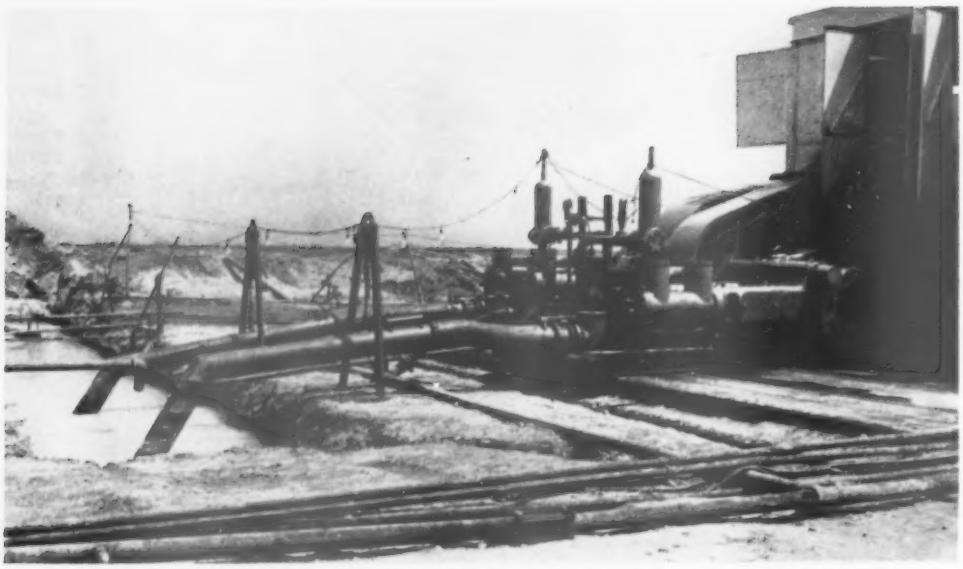
Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER



Top: This view of the Wilson Super Titan "66" compound shows Diamond sextuple and quadruple roller chain. The Super Titan rig on location in Ventura, California, is believed to be the world's largest drilling rig.



Right: The transmission view of the Wilson rig shows quadruple and double Diamond Roller Chains. Diamond Chain engineering staff co-operated with Wilson many years ago to help perfect and successfully manufacture the first chain drive transmission drilling rig.



SHORT, DIRECT SUCTION should be provided for the power slush pump, as shown here. Installation is typical of good practice found in the Odessa, Tex., area.

Get the Most From Your Power Slush Pumps

. . . Here's how

If the operator will observe the pump manufacturer's rated discharge pressures for various size liners, together with the suggestions given here, he can eliminate a great number of power pump troubles and obtain the service for which the pump was purchased.

by C. P. Jenkins

THE power slush pump is rapidly becoming one of the most important pieces of machinery on a drilling rig. More pumps are being used today than at any time in the past. Whether or not a pump is of adequate capacity may mean the difference between profit or loss in drilling.

With the possible exception of rig-up time and trip time, maintenance of the slush pump requires more man-hours than any other drilling operation. Too much emphasis cannot be placed on the importance of proper maintenance of slush pumps.

Adhere to Manufacturer's Ratings

To obtain the maximum service from the power pump, follow closely the manufacturer's ratings. Maintain the rated speed of the pump as near maximum as possible. Do not permit pressure to exceed the rating for each liner size; to do so shortens the life of the bearings and gears. The life of roller bearings varies with about the third power of the load. With an overload of 100 per cent, the life expectancy of the pump will conceivably decrease 8 hours for each hour of the overload.

Bearing manufacturers, when asked to predict the life of antifriction bearings in slush pumps, refer to it as a B-10 life, meaning that the minimum life of 90 per cent of the bearings can be predicted. The life of the other 10 per cent cannot be predicted because of failures of unexplainable nature. The average life of 90 per cent of the bearings is from 4 to 5 times that of the minimum life; the maximum life may be as much as 25 times the minimum life.

When a pump is operated below its rated speed, the horsepower must decrease in the same proportion in order that the torque load will not exceed the rated torque value of the bearings and gears. A pump has a different horsepower rating for different speeds. For example, a pump with a rated speed of 60 s.p.m. and discharge pressure of 855 psi. at 840 g.p.m. with maximum size liners of 7¾ in. will require an input horsepower of 459 and torque of 43,500 ft.-lb. If the pump is speeded to 70 s.p.m. with the discharge pressure of 855 psi., this would equal an input horsepower of 575 and a torque of 43,500 ft.-lb. The torque remains constant, but the horsepower increases in direct proportion to the speed.

This example does not represent an overload on the pump, but as another example assume that the 7¾-in. liners are left in the pump until such time as the pump is operating at only 40 s.p.m. with a discharge pressure of 1,200 psi. The horsepower requirement would be 460, but the torque would soar to 60,250 ft.-lb. This would represent a 38 per cent overload, assuming that the gear has a torque rating of 43,500 ft.-lb. Thus, it can readily be seen that horsepower is of little concern as long as pump is operating at rated speed and does not exceed rated liner pressures.

Application of Fluid End Parts

Certainly the application of fluid end parts to a pump in the proper manner

Author is associated with National Supply Co., Odessa, Tex.

is an important factor in the amount of service those parts will render. For example, when installing the valve seats in the valve pots, take care to thoroughly clean the tapered bore of the fluid end and the tapered outside surface of the valve seat and to install the seat dry. The valve seat should be driven solidly into position. After installing the valve and valve seat, make sure that the valve guide bushing is not excessively worn, as a worn bushing cannot properly guide the valve against the valve seat. A great deal of valve and valve seat trouble is caused by excessive wear of the guide bushing.

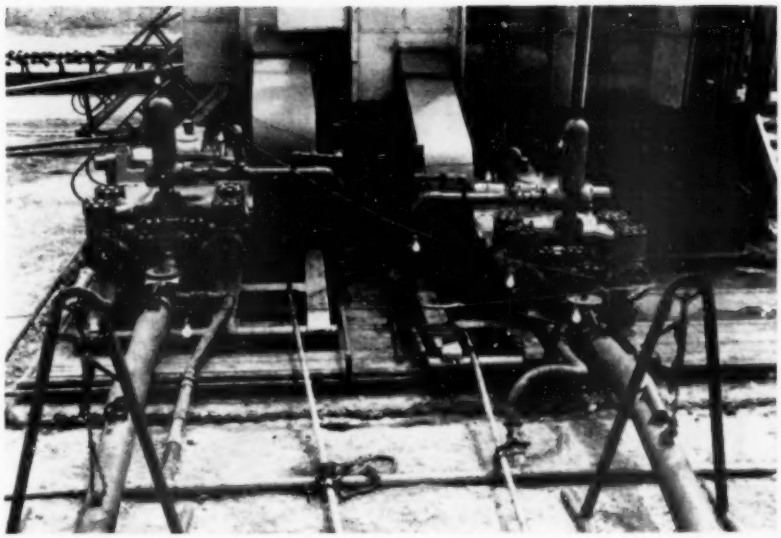
On pumps requiring hydraulic packing between the valve cover plate and the valve pot, this packing should protrude sufficiently beyond the cover plate to form an effective seal when the cover plate is tightened. In tightening the valve cover plate, tighten the nuts evenly, moving from one side to the opposite much as in tightening the wheel lugs on a car. Failure to do this creates bending stresses in the valve-cap studs and will cause some to break, unable to absorb the amount of strain. The procedure in tightening flange connections on the pump, such as the cylinder heads and air chambers, should be the same as for the valve caps.

In applying water cylinder liners in the pump, make sure that the bore of the pump is free of any foreign matter. If the liner bore of pumps requires a sealing shoulder for the liner and packing, this shoulder should be close to square. Liner seal rings should be in good condition. The inside surface of the water cylinder liner should be free from any irregularities such as pits or grooving, as these will shorten the service received from the piston.

Clean all parts . . . In applying the piston to the rod, the bore of the piston and the outside surface of the piston rod at the piston position should be thoroughly clean. In tightening the piston on the piston rod with the piston lock nut, use a wrench with a 6-ft. extension with all the force that one man can apply. If there is a shoulder on the piston rod, the piston should be in full contact against this shoulder when tight.

A small amount of lubricant, such as graphite or mud, should be applied to the piston before it is installed in the cylinder liner; this facilitates installation and prevents breaking the piston lip. Be sure that the piston-rod lock nut is square and smooth on the surface that contacts the intermediate rod. If it is not, excessive strain or stress can occur, causing breakage of the piston or intermediate rod.

When packing the piston rod with other than split rubber rings, follow closely the instructions sent with each set of packing. Take care that the piston-rod gland equalizer is tightened evenly and that it is only tight enough to prevent the packing from leaking. If the equalizer is tightened unevenly, the packing will wear the piston rod excessively on one side. If it is tightened too much, the effectiveness of the packing will be reduced and there will be excessive wear of the piston rod.



POWER SLUSH PUMP should be set level on a solid foundation such as the timber mat shown here.

The water cylinder liner cages should be in such condition that the contact area between the cage and the liner is square and smooth, permitting full contact.

On pumps using liner set screws in the cylinder head, loosen these screws so that they will not contact the liner cage while the cylinder head is being tightened. After the cylinder head is tightened evenly, the liner set screws should be tightened sufficiently to prevent leakage of fluid from the tell-tale hole in the cylinder wall. If the liner set screws are not backed off before tightening the cylinder heads, there is a possibility of distorting the liner or even of cracking the fluid end.

Short suction . . . The suction on pumps should be of the same size as the flanged connection furnished by the manufacturer for that purpose. A short and direct suction is always best and a flooded suction is preferred. When this is impossible the suction pipe should be submerged at least 2 ft. If bends are required in the suction line, long-sweep ells should be used. When a rubber suction hose is used, inspect it frequently, particularly on the inside. Old hose sometimes collapses from within and starves the pump for fluid.

Inspect the suction to insure that it does not suck air into the system. In areas where earthen slush pits are used, it is well to use a suction strainer to prevent mesquite roots, tree limbs, lumber, etc., from entering the suction. Any of these will cause the pump to starve and will result in a fluid knock. If the pump has not been in operation for some time, prime it before placing it in service. Considerable damage is done to pistons and valves when they operate dry, even for a few strokes.

It is well to jet the pump suction at intervals to keep sand from partially filling the suction and starving the pump for fluid. At the completion of each well, wash the suction to remove any sand or cake that has formed.

Shear relief valve essential . . . A shear relief valve should be installed in the discharge line of the pump with the proper nail to shear at not more than manufacturer's rated maximum working pressure. The discharge from this shear relief valve should be piped or protected so that it will not be discharged on to a workman, nor back into the suction of the pump. If the valve is plugged, excessive pressure can burst the fluid end of pump. If it is discharged back into the suction, air will enter the suction, causing an air or fluid knock. Install a strainer on the discharge side of pump to catch any rubber torn from the piston and valve inserts and check this strainer frequently.

The pump should be set level and on a solid foundation, such as a steel pump cradle or a timber mat.

Aligning V-belt drive . . . One of the more expensive items pertaining to the pump is the V-belt drive. Extra precaution should be taken to properly align the sheave on the pump with the sheave on the driver. Once the proper

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now offers not one, not two, but THREE ranges of

Hinge-Lok Casing Centralizers

. . . with increased reach (bowed height) of springs to provide AMPLE ALL-AROUND cementing space for ALL casing programs, and VARYING hole sizes and conditions, PLUS unsurpassed convenience and ease of installation.

"Reach" (Bowed Height) is vital factor

All Baker HINGE-LOK Casing Centralizers have greater reach (or bowed height) of springs in corresponding ranges than any other casing centralizers on the market.

Increased reach means adequate, all-around cementing space even though the hole size varies considerably from the drill bit size. Without this increased reach, it is quite probable that casing may contact the wall of the hole between centralizers resulting in a poor cement job at that point.

Hinged for easy mounting

Baker HINGE-LOK Casing Centralizers can be *installed in a matter of seconds* while running-in, as *no welding is required*. Just close the HINGE-LOK Centralizer *around a coupling* and then insert drive nails which *thread themselves* into the hinge knuckles, and *will not come out*. When exact spacing is desired, easily installed Stop Rings can be plug-welded at required positions.

Maximum effective centering force

Baker HINGE-LOK Casing Centralizers provide the most uniform annular cementing space around the casing. And this cementing space is present regardless of repeated flattening of the springs in a deep well, or of off-vertical condition of the hole.

The engineered bow shape of the springs, with an ideal relationship between the length and the bowed height of the springs, provides *greater landed centering force* than can be obtained from any other available hinge-type centralizer covering the same range of hole sizes.

All springs work together

All of the powerful springs of Baker HINGE-LOK Casing Centralizers work together to offer a combined positive resistance against any tendency of the casing to contact the wall of the open hole. As the springs are forced toward the casing by contact with the wall of the hole, their effective length is decreased, thereby stiffening them and increasing their resistance to further deflection.

Unlimited rotation of casing

Whether Baker HINGE-LOK Casing Centralizers are installed around couplings or over a standard Stop Ring, the casing can be freely rotated without rotation of the centralizers.

Easy starting without snubbing

The superior spring design of Baker HINGE-LOK Casing Centralizers assures easy starting without sacrificing the powerful centering force delivered after full down-hole travel of the casing. By following the easily read "Starting Force Spacing Guide," all need for applying external starting force is eliminated even in relatively close-tolerance programs.

BAKER MODEL "H"
20 Range HINGE-LOK
Casing Centralizer

PRODUCT NO. 9112

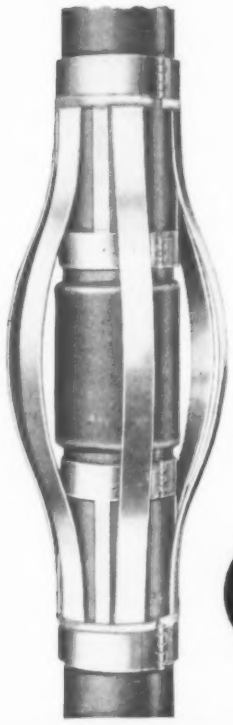
Recommended where LESS-THAN-NORMAL CLEARANCE exists between the casing ON which the centralizers are mounted and the casing THROUGH which the centralizers are run. If the formation is such as to create special problems of over-size or irregularity of the open hole, it is often advisable to run the "H-20" Centralizer on the first few joints—for ease in starting—followed by the "H-25" or the "H-50" Super-Range Centralizer.

BAKER MODEL "H"
25 Range HINGE-LOK
Casing Centralizer

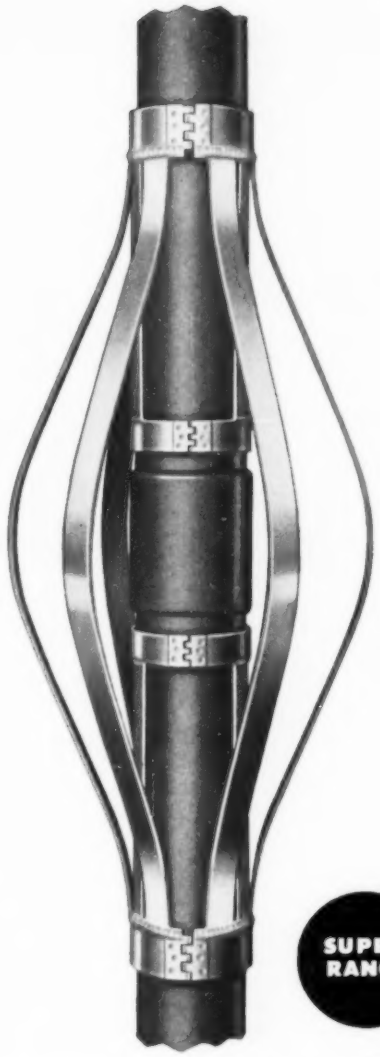
PRODUCT NO. 9113

Recommended where NORMAL CLEARANCE is present, and no serious problem of over-size hole is anticipated. The "H-25" Centralizer is recommended where conditions are such that starting force would be a problem with the "H-50" Super-Range Centralizer, in which case the H-25 might be used on the first few joints and the H-50 run above it. Although the H-50 requires a larger spacing interval for easy starting than the H-20 or the H-25, fewer "H-50" Centralizers—with their superior reach—ensure even greater effective centering force.

20 RANGE



25 RANGE



SUPER-RANGE

BAKER MODEL "H-50"
Super-Range HINGE LOK
Casing Centralizer

PRODUCT NO. 9114

Recommended for GREATER-THAN-NORMAL CLEARANCE—wherever the diametral clearance between the casing ON which the centralizers are mounted, and the casing THROUGH which they are run exceeds five inches, or for NORMAL CLEARANCE where extensive hole irregularities are anticipated. No other centralizer can provide such effective centering action as the "H-50" in *irregular or over-size hole sections, or in cavities*. By increasing the bow of the springs (without proportionately increasing their resistance to starting) maximum centering efficiency is assured, regardless of individual well conditions.

BE SURE YOU GET

Maximum Centering Force

THROUGHOUT THE ZONE

TO BE CEMENTED

Always *pulled*—never pushed

Baker HINGE-LOK Casing Centralizers are always "pulled" during upward or downward travel of the casing in the well. This feature is important when the centralizer passes through any tight spots in the hole—and is especially advantageous when reciprocating casing during cementing operations.

Call Baker for Centralizer service

Any Baker representative, or office, is ready to give you the kind of service every operator appreciates—sincere, courteous assistance to help you get successful "first-time" cementing results.

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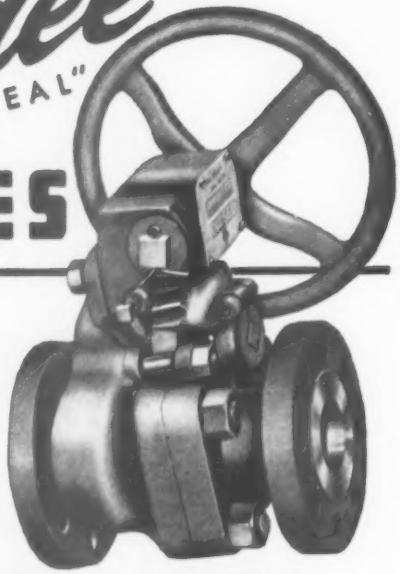

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Underwriters' Laboratories, major LP gas producers*, and Liquified Petroleum Gas Commissions of several States* approve Okadee Valves for primary shut-off in LP gas lines. In addition, Okadee Valves are used in virtually all types of gas and liquid lines at pressures to 600 p.s.i. and temperatures to 800°F.—wherever a perfect seal, low maintenance and long life are necessary.

Get complete data, including material specifications, on Okadee Valves — and newest Underwriters' Laboratories test report—without obligation, today.

**Names on request.*

- **A. S. A. Standard dimensions**
- **Sizes from ½" to 6"**
- **Single- and double-seated disc valves**
- **Hard-faced valves and seats . . . perfect metal-to-metal seal**
- **Self-cleaning, self-compensating valve discs**
- **Lever, rack-and-lever, or worm-gear operation**
- **Non-lubricated**
- **No wedge action**
- **Valves and seats wear in instead of "wearing out"**
- **All parts quickly replaceable in the field**
- **Inside and outside stem packing . . . double assurance against stem leaks**

Underwriters' Laboratories Reexamination Service Guide No. 141 A3.1.22, File MH5163. SL Screwed Type Series and Series 15 and 30 Flanged Type Okadee Valves are suitable as a positive shut-off in LP gas pipelines and other LP gas applications for a working pressure of 250 p.s.i.

Write for Bulletin No. 51FL

OKd. Okadee COMPANY
332 South Michigan Avenue • Chicago 4, Illinois

alignment is made, it can be maintained by applying pump braces, preferably two, between the pump skid and engine substructure. Several manufacturers make such a brace. One brace should be applied on each side of the pump.

V-belts to the driver should be installed carefully, to avoid damage to a belt. Move the pump back toward the driver sheave so that the clearance is ample to apply the belts without stretching. The load side of the belts should be the tight side; this can be determined by the direction of rotation of the sheaves when the load is applied.

Assuming that the load side of the belts is across the top of the drive, these belts should be even all across the drive midway between the two sheaves. If they are not, use a 2 by 4-in. timber and strike across the loose side of the belts at the bottom of the drive until the belts on the load side are even all the way across. Another method of getting all the slack of the belts on the opposite side of the load side is to slip the belts by hand, then use pump braces to jack the pump out and away from the driver sheave until there is sufficient tension in the belts for the drive.

One method of finding the correct tension is to take a belt, on the slack side, between the thumb and forefinger and pull it down approximately 3 in. This should be sufficient tension. Keep the belts free of grease and check their tension occasionally. Any belts that have excessive slack should immediately be removed from the drive, so they cannot damage other belts.

Follow Lubrication Instructions

Adhere strictly to the manufacturer's recommendation of lubrication. Change the oil in the gear end of the pump at least every 6 months of operation, and more often if condensation or foreign matter enters the crank case. On pumps that employ an air breather of the filter type on the gear end, remove and clean the filter at least once every 30 days. Use a good grade of roller-bearing grease on the bearings every 8 hours. The use of oil instead of water on the piston rods had proved a boon to the life expectancy of the rods, increasing their service two to three times.

Nearly always when a major overhaul is required, it is necessary to bring the pump to a competent shop. In the case of bearing replacement or adjustment, adhere to the manufacturer's recommendation. Where possible the manufacturer's service man should be present at time of major repairs or at least consulted so that proper clearance or preload of the bearings is made.

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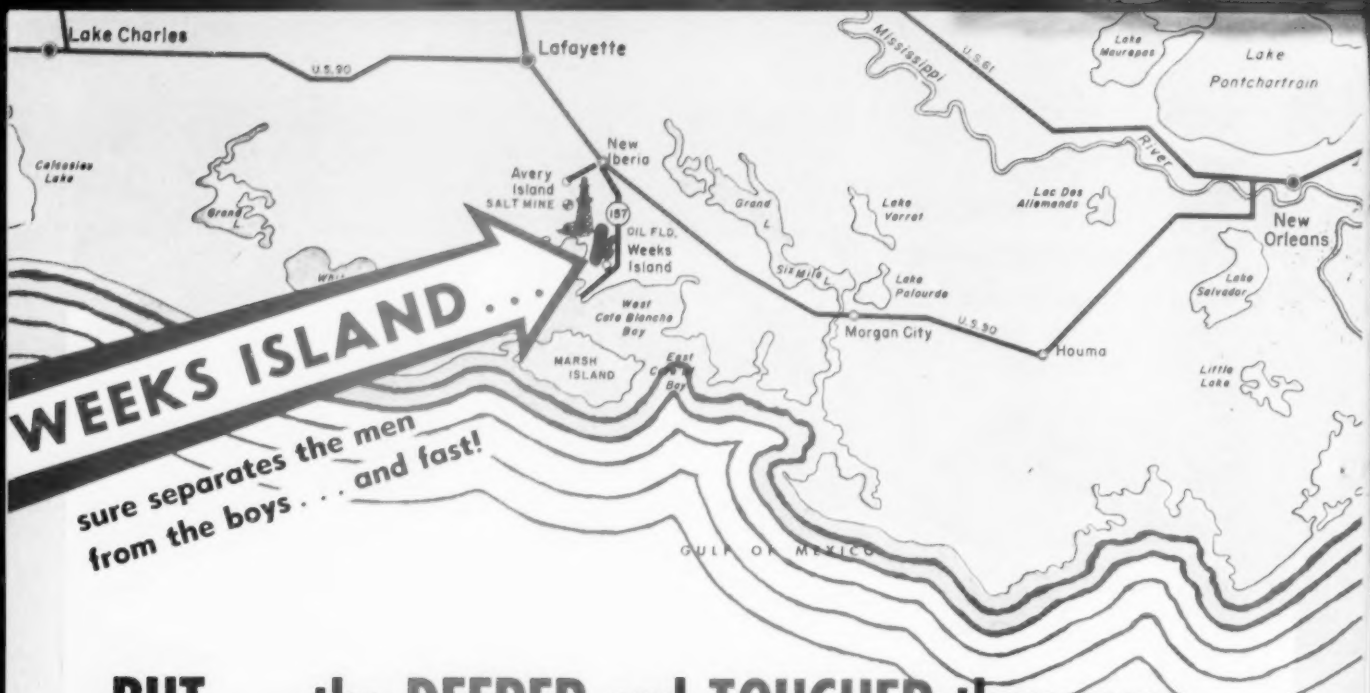
XL Steel Pipe Couplings for OIL COUNTRY TUBULAR PRODUCTS.



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At Weeks Island, world's deepest oil field, PGAC has been one of the principal service companies logging, perforating, and setting deep-well packers.

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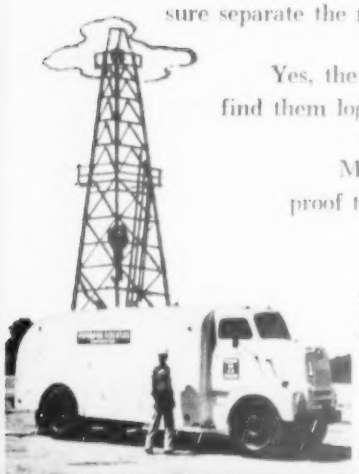

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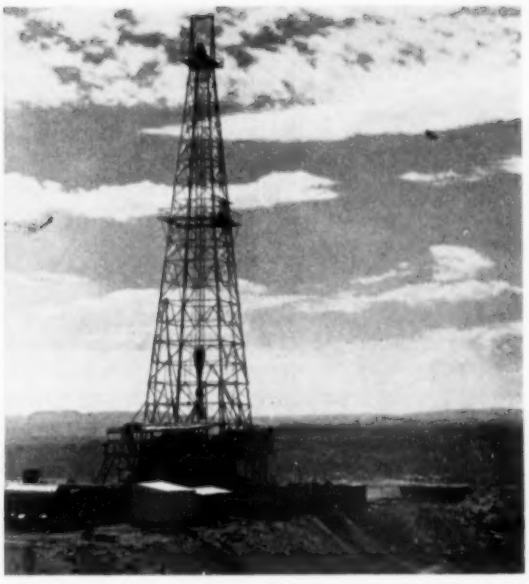
ON THE RIVERTON ROAD this signboard points the way to the field situated in the tributaries of Beaver Creek.



DRILLING OPERATIONS at Beaver Creek are designed for various objectives including Cretaceous, Pennsylvanian, and Mississippian oil and gas reservoirs.

WIND RIVER BASIN

Beaver Creek Natural-Gas Production 30 Million Cubic Feet per Day

by Joseph A. Kornfeld
District Editor

BEAVER CREEK field, Fremont County, contains one of the more important natural-gas reserves in the Wind River basin of western Wyoming. Gas production is obtained from the Frontier, Muddy, and Dakota-Lakota sandstone reservoirs of Cretaceous age.

During winter, gas withdrawals rise to as much as 30 M.M.c.f. per day and drop to 16 M.M.c.f. per day during summer months. This field supplies about one-half of the requirements for domestic and industrial markets at Casper.

Sole gas purchaser is Northern Utilities Co., of Casper. This firm has a 6-in. natural-gas-transmission line through Beaver Creek field. Gas withdrawals from Beaver Creek gas wells averaged 20,355 M.c.f. per day during the first 6 months of 1953. Stanolind Oil & Gas Co., unit operator at Beaver Creek, initiated this gas development during 1946.

Discovery gas well was Stanolind's 1 H. C. Johnson, SE SE 3-33n-96w, which was completed from the Jurassic Morrison sandstone for an estimated open flow of 9 M.M.c.f. of gas per day from 8,230-85 ft. Originally it was drilled to a total depth of 8,920 ft. in Jurassic Sundance sandstone. This discovery well was produced into Northern Utilities gas line after installation of heaters.

Initial open-flow potentials of as high as 10 M.M.c.f. per day were recorded in subsequent well development, principally in Lakota sandstone reservoir. Unit area, originally effective September 1, 1937, was enlarged 10 years later on September 4, 1947.

Beaver Creek field lies 14 miles southeast of Riverton and 20 miles east of Lander. It is situated in a southward extending tributary embayment of Wind River basin.

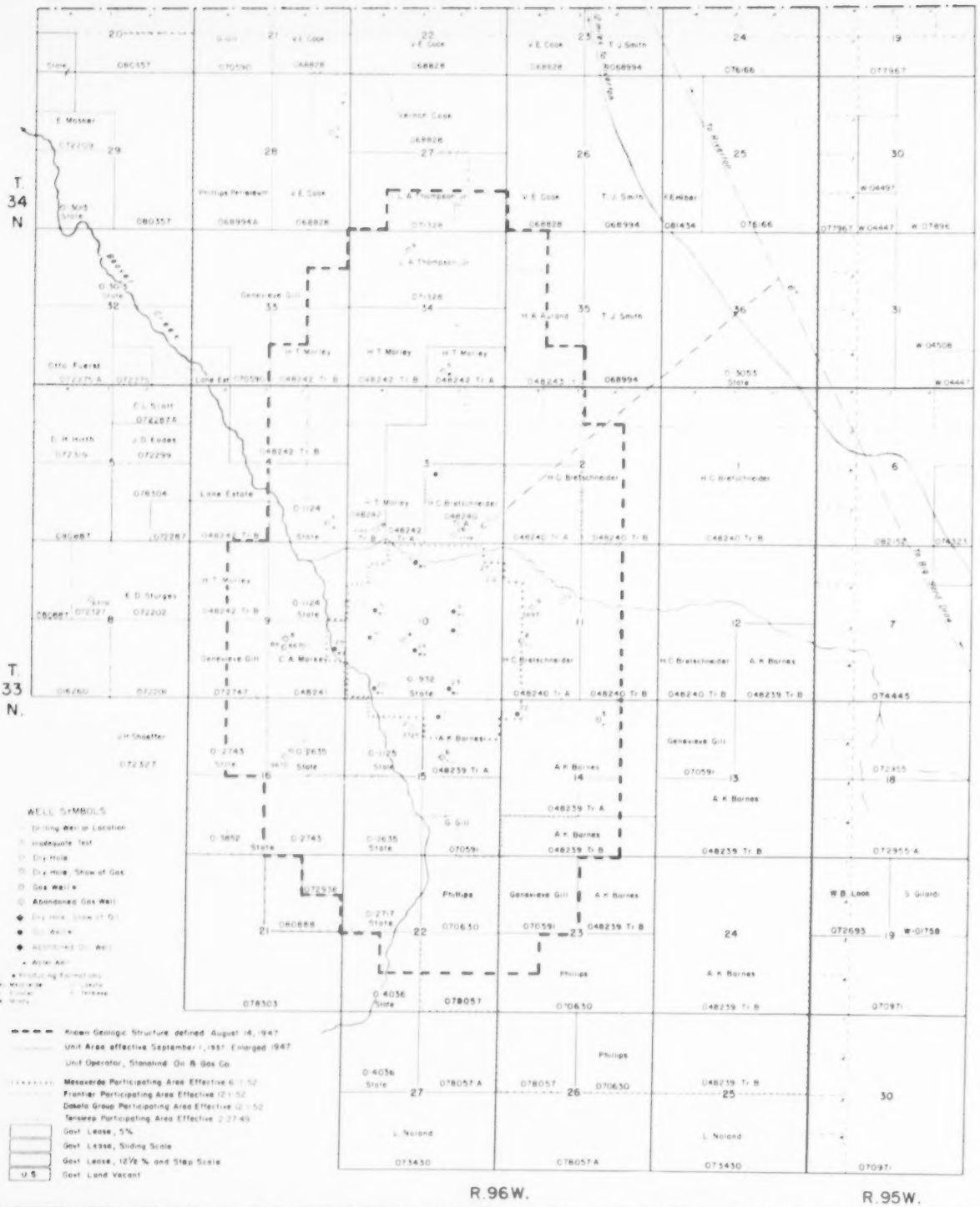
TYPICAL FORMATIONAL SEQUENCE, BEAVER CREEK OIL FIELD, MADISON EXPLORATORY TEST, FREMONT COUNTY, WYOMING

Stanolind Oil & Gas Co. 13 Tensleep Unit, C SE NE 28-34n-96w

Surface elevation: 5,407 derrick floor.

Geologic formations—	Top logged at (ft.)
U. Cretaceous:	
Lance	1,160
Meeteetse	2,035
Mesaverde	3,303
Cody	4,532
Frontier	7,320
Muddy	8,770
Dakota	8,943
Lakota	9,123
Jurassic:	
Morrison	9,205
Sundance	9,420
Gypsum Springs	9,718
Nugget	9,878
Triassic:	
Chugwater	10,345
Dinwoody	11,550
Permian:	
Phosphoria	11,590
Pennsylvanian:	
Tensleep	11,878
Amsden	12,345
Mississippian:	
Madison	12,468
Total depth	12,750

Geology . . . Beaver Creek structure is a gently folded anticline with 100 ft. of closure in the beds of Eocene Wind River formation. The fold is intercepted in the south by east-west trending normal faults exhibiting a maximum vertical displacement of 160 ft. Subsurface structure of the anticline as reflected on top of the Lakota sandstone is that of an asymmetrical anticline with a north-south major axis extending for


T. 34 N.
T. 33 N.
R. 96 W.
R. 95 W.
WELL SYMBOLS
Beaver Creek
Riverton
Room Geologic Structure defined August 14, 1947
Unit Area effective September 1, 1951. Enlarged 1947
Unit Operator, Stanolind Oil & Gas Co.
Mesaverde Participating Area Effective 6-1-52
Frontier Participating Area Effective 12-1-52
Dakota Group Participating Area Effective 12-1-52
Tensleep Participating Area Effective 2-27-49
Govt. Lease, 5%
Govt. Lease, Sliding Scale
Govt. Lease, 12½ % and Step Scale
U.S. Govt. Land Vacant

PARTICIPATING AREAS for Mesaverde, Frontier, Dakota, and Tensleep reservoirs at Beaver Creek oil and gas field, Fremont County, Wyoming, are outlined on this field map. (Courtesy USGS).

a known distance of 7 miles. Riverton dome to the north is believed to lie on the same regional fold as Beaver Creek. Center of structure is 10-33n-96w. More than 1,200 ft. of structural closure has been mapped at Beaver Creek with a total closure yet to be established. A well density of 640 acres per well for gas well development has been followed at Beaver Creek. This spacing practice has proved very satisfactory to date.

Gas analysis . . . Field tests indicate an average gas gravity of 0.612. Net thermal content averages 947 B.t.u. per cu. ft. (air free). A typical fractional analysis shows a methane content of 93.54 per cent by volume.

Mesaverde oil reservoir was discovered on July 1, 1951, with completion

of Stanolind's 15 Unit, SE SW NW 10-33n-96w. Initial flowing potential was 226 bbl. of oil per day from 3,693-3,828 ft.

Tensleep oil reservoir of Pennsylvanian age was discovered on February 27, 1949, with completion of 11 Unit, C N/2 SE 10-33n-96w. It was finaled flowing 474 bbl. of 45°-gravity oil through a ½-in. choke. A gross section of 452 ft. of Tensleep sand and shale was logged in this well but portions were tight and hard.

Crude-oil production is obtained from 12 oil wells completed from the Cretaceous Mesaverde sandstone found at 3,800 ft. and from the Pennsylvanian Tensleep sandstone at 10,800 ft. During the first 6 months of this year crude-oil production averaged 1,613 bbl. of oil per day. Cumulative oil recovery since discovery of oil in 1949 to July 1, 1953, was 1,813,195 bbl.

Mesaverde wells . . . Bore-hole practice employed in drilling a well to the Mesaverde oil reservoir calls for cutting a 12½-in. hole to a depth of about 315 ft.; a 10¾-in. surface casing is set, and about 300 sacks of cement are placed behind the pipe.

Shoe is drilled under surface pipe with a 9-in. bit and long hole of this size is carried to a depth of about 3,500 ft. Long string is 7-in. pipe set at that depth and cemented with 650 sacks.

Tensleep wells . . . Surface hole for a Tensleep project is 17½-in. cut to a depth of 90 ft.; cement is circulated to the surface. Protection casing of 9⅝-in. diameter is set at approximately 3,000 ft. with 675 sacks and long hole is 8¾ in. carried to a depth of about 10,500 ft. Oil string is 7-in. casing set in the upper portion of Tensleep sandstone and cemented with 1,000 sacks.

Stanolind's 22 Tensleep Unit, NW NW NW 14-33n-96w, required 133 over-all days, 103.5 net days, and 59.5 rotating days in drilling to a total depth of 11,299 ft.

After a depth of 4,000 ft. was reached in this well, crooked-hole trouble was experienced; by the time a depth of 10,000 ft. was reached, deviation increased to 5°.

A total of 860 ft. of diamond coring was conducted with a 5⅞-in. bit in the interval between 10,235-11,299 ft. Penetration rates averaged 2.5 ft. per hour.

Reaming operations were difficult in the Permian Phosphoria limestone and 8⅝-in.-diameter head was employed in an effort to speed up this operation.

Madison wells . . . Contractor cuts a 17½-in. hole for the 13⅜-in. surface pipe. Cement is circulated back of the pipe to the surface. Intermediate section is cut with a 12½-in. bit in which a 9⅝-in. protection casing is set; cement is circulated to surface. Long hole is 8¾-in. and a 7-in. oil string is set through formation objective. In this section, contractor carries twenty 6¼-in. drill collars to maintain straight hole.

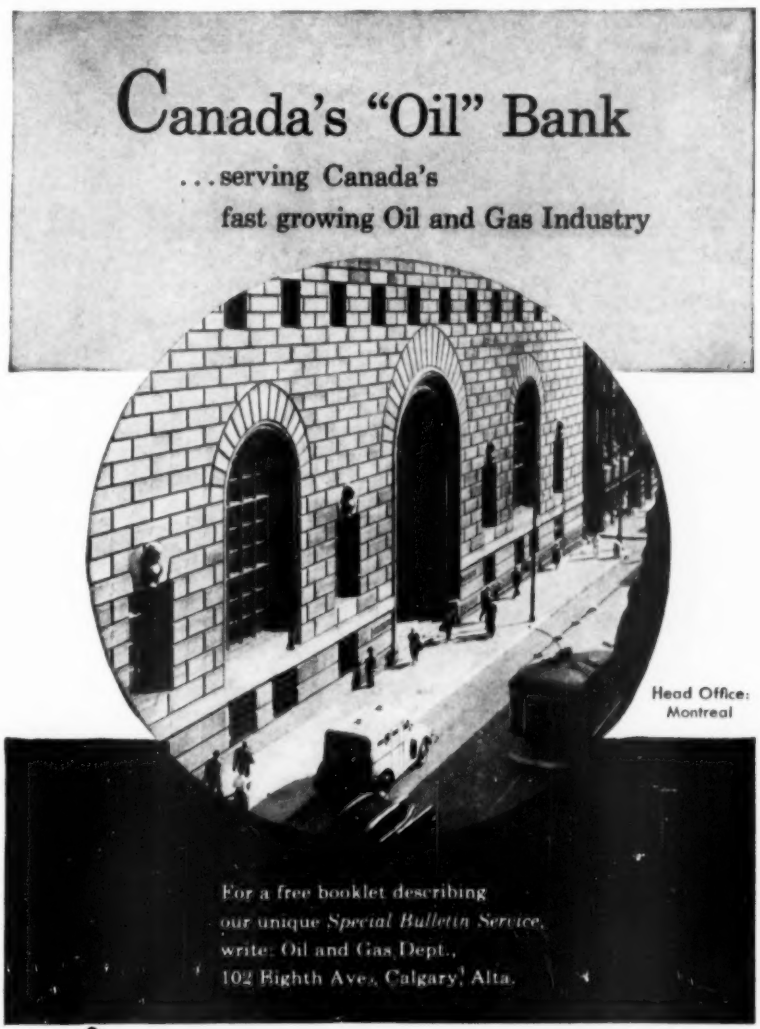
Cretaceous shales are soft and cut easily, particularly in the Mowry shale section; consequently, drillers find it difficult to keep holes straight.

Loffland Brothers Co. is operating rig No. 72 for Stanolind on a deep test now drilling to the Mississippian Madison limestone objective. This well is 30-M in NW NE 10-33n-96w. Currently it is drilling below 9,594 ft. This rig is a Model 125 draw works powered by four engines which also drive the two 7¼ by 18-in. mud pumps. Rig is mounted on a 136-ft. steel derrick and a 14-ft. substructure.

TABLE 1—DISTRIBUTION OF WELLS BY RESERVOIRS, BEAVER CREEK GAS FIELD, FREMONT COUNTY WYOMING

Frontier sandstones	4
Muddy sandstones	2
Dakota-Lakota sandstones*	3
Field total	9

*Dual completion, with Frontier sandstones.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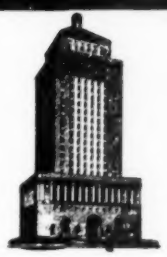
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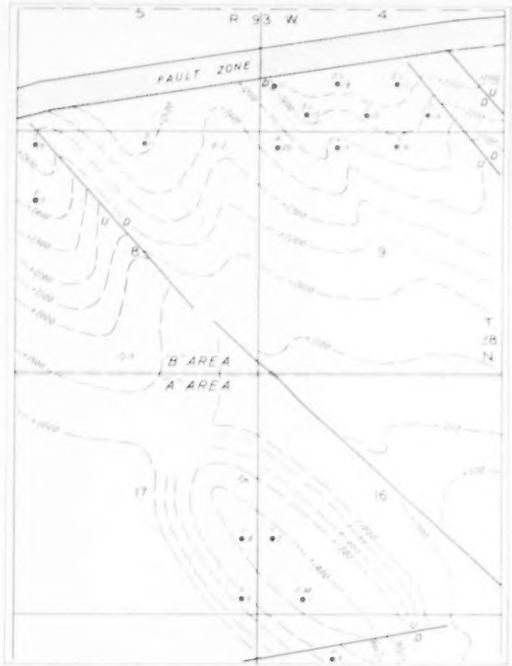
PLACE-FIX MAP of a portion of western Wyoming showing location of Happy Springs oil field and adjacent producing areas.



SUBSURFACE STRUCTURE contour map of Happy Springs oil field contoured on top of the Dakota sandstone of Cretaceous age.

FAST HOLE IN TILTED STRATA

Fifty Feet per Hour at Happy Springs

Rig efficiencies of 82 to 88 per cent achieved

by Joseph A. Kornfeld
District Editor

HIGH penetration rates of about 50 ft. per hour have been attained in drilling highly tilted Cretaceous strata in Happy Springs field, Fremont County, Wyoming. Moreover, over-all penetration rates of as high as 26.4 ft. per hour have been recorded throughout the Mesaverde, Shannon, and Frontier sandstone and shale sections despite frequent losses of mud circulation.

Dipmeter surveys have indicated dips as high as 43° but bore-hole deviations have been held to less than 7¼°. Generally average dips have been 20° and bore-hole deviations have averaged 3½°.

Despite these and other drilling problems, contractors working in this field have developed rig efficiencies ranging from 82 to 88 per cent on at least five wells. Average rig efficiencies (obtained by dividing number of drilling days by number of total days consumed for rig time on a given well) for all 18 wells

General Field Data . . .

Method of exploration: Seismograph.
Date of field discovery: April 11, 1950.
Type structure: Asymmetrical anticline, with reverse faulting in Cretaceous beds.
Discovery oil well: Sinclair Oil & Gas Co. 1 Happy Springs Unit, SE SW SW 16-28n-93w, TD 10,034 ft., plug-back depth, 6,590 ft. Top of Frontier sandstone, 5,255 ft. (+2,910 ft.). IP 131 bbl. of 37.4°-gravity oil, and 41 bbl. of 36.9-gravity Muddy sand oil in 24 hours.
Wells:

Pumping oil wells (June 30, 1953)	7
Flowing oil wells (June 30, 1953)	8

Deepest well drilled: Sinclair Oil & Gas Co. "A"-1 Happy Springs Unit, TD 10,034 ft. in Tensleep sand topped at 9,971 ft.
Well spacing:

"A" area, oil well acres/well	40
"B" area, oil well acres/well	20

Production:

Daily average oil production (May 1953), bbl.	1,503
Cumulative oil production (to June 1, 1953), bbl.	458,867
Average produced oil gravity, °A.P.I.	37.5

Market outlet: Sinclair Pipe Line Co. oil line to Sinclair Refining Co. plant at Sinclair, Wyo.
Operator: Sinclair Oil & Gas Co.
Number of active drilling rigs (July 1, 1953)—3.

drilled to date in this field have been 67 per cent.

Geology . . . Tertiary Wind River beds unconformably overlap the Cretaceous Steele shale and obscure surface indications of structure. Seismic methods were employed in discovery of Happy Springs anticline.

Subsurface well data indicate that Happy Springs anticline is an elongate asymmetrical fold exhibiting a northwest-southeast major axis with steep dips on the southwest flank. In the discovery well, dip of 57° was logged at the Tensleep marker and the well crossed the axial plane and was bottomed on the steep-dip side of the structure. In the lower formations, the axial plane dips 60° NE.

Reverse faulting is known from well data; Sinclair's 3 Happy Springs Unit crossed a reverse fault as shown from a repetition of the Third Frontier sand.

Drilling Rigs

Drilling contractors active in Manderson field include Peak Drilling Co., Inc., and George Acuff Drilling Co., of Casper, Wyo., and Signal Drilling Co., Tulsa.

Peak Drilling Co. drilled the discovery well and since has completed four wells. At present, this contractor is drilling with a Model 50A rig powered by two NK motors with a rating of 225-hp. each. These drive a Model C-250 (7¼ by 15-in.) slush pump. Derrick is a 127-ft. standard steel unit mounted on a 7-ft.-high substructure.

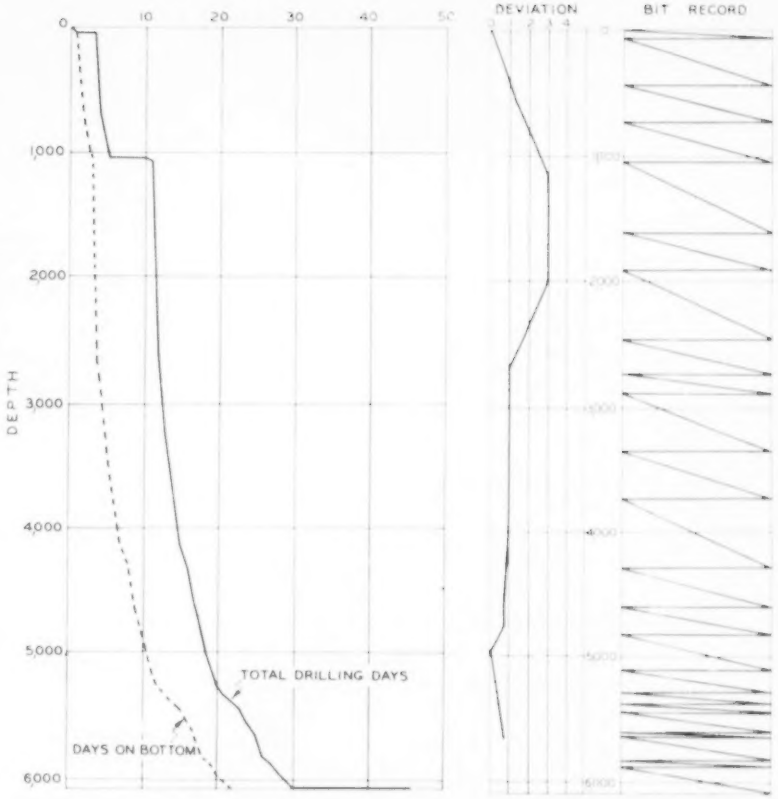
Acuff operates two rigs in the field at this time. Rig 5-K is a 10,000-ft. draw works powered by two 12-cylinder engines with a rating of 350-hp. each. These drive a WS 7¾ by 16-in. slush pump. The mast is 132 ft. in height and is mounted on an 8-ft.-high substructure.

Rig 7 is a Model 64-B draw works capable of drilling to 7,000 ft. Power is two 325-hp. each motors which drive a 7½ by 14-in. slush pump. The derrick is 132 ft. in height and is mounted on an 8-ft.-high substructure.

Signal's rig is a Model 50 draw works powered by two 1879 motors rated at 225-hp. each. These drive a Model C-250 (7¼ by 15-in.) slush pump. Rig is mounted on a 132-ft.-high derrick and a 10-ft.-high substructure.

Drilling Problems

One of the major drilling problems at Happy Springs is the highly faulted character and the high angle dips of the Cretaceous rocks. Dipmeter surveys run in wells in this field indicate dips as high as 43° but bore-hole deviations have not exceeded 7¼° despite this condition. However, dips have averaged about 20° and maximum deviations in a given well will usually be less than 5°. Average deviations are about 3½°. Maximum deviations occur in the Cretaceous Cody shale and the Triassic Chugwater formation.



HIGH RIG EFFICIENCIES obtained on many wells drilled at Happy Springs are reflected by this penetration curve. (Rig efficiency is the percentage obtained by dividing total days on bottom by total drilling days.)

DEVIATION AND BIT-RECORD charts illustrate high deviations and excellent bit performance logged in Upper Cretaceous shales at Happy Springs.

Winter weather . . . A serious handicap in development of this field has been the effect of winter weather on efficiency of drilling crews. As much as 20 per cent of shutdown time during the winter months has been caused by storms, bitter cold weather, and road conditions. The field lies at a high surface elevation; "A" area lies at an elevation of 8,100 ft. above sea level and "B" area at 7,100 ft. above sea level.

Circulation losses . . . Despite losses of mud circulation in Mesaverde, Shannon, and Frontier sandstones, over-all penetration rates have been recorded as high as 25.4 ft. per hour, i.e., actual drilling time on bottom. In some cases, thick Cretaceous shale sections have drilled fast; one section of 548 ft. was drilled in 11 hours or at a penetration rate averaging 50 ft. per hour.

A wide divergence occurs between the over-all progress and net progress drilling curves shown in an accompanying chart. A total of 68 over-all days were required to reach total depth of 6,500 ft., whereas the net curve indi-

TABLE 1—TYPICAL FORMATIONAL SEQUENCE, "B" AREA, HAPPY SPRINGS OIL FIELD, FREMONT COUNTY, WYOMING

(Sinclair Oil & Gas Co. 10 Happy Springs Unit, 330 ft. from south line, and 2,310 ft. from west line, southeast quarter, 4-28n-93w. Surface elevation: 7,093 ft. ground)

Geologic formations—	Top logged at (ft.)
U. Cretaceous:	
Cody shale	1,025 (6,068)
Niobrara chalk	2,910 (4,183)
Frontier	3,135 (3,958)
Mowry shale	3,833 (3,260)
Muddy sandstone	4,296 (2,797)
Thermopolis	4,347 (2,746)
Dakota sandstone	4,488 (2,605)
Lakota sandstone	4,588 (2,505)
Jurassic:	
Morrison formation	4,666 (2,427)
Sundance	4,856 (2,237)
Nugget	5,036 (2,057)
Triassic:	
Chugwater	5,323 (1,770)
Alcova	5,750 (1,343)
Dinwoody	6,520 (573)
Permian:	
Phosphoria	6,570 (523)
Pennsylvanian:	
Tensleep	6,874 (219)
Total depth	6,912 (181)

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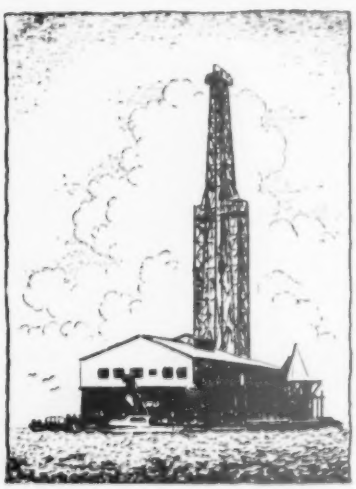

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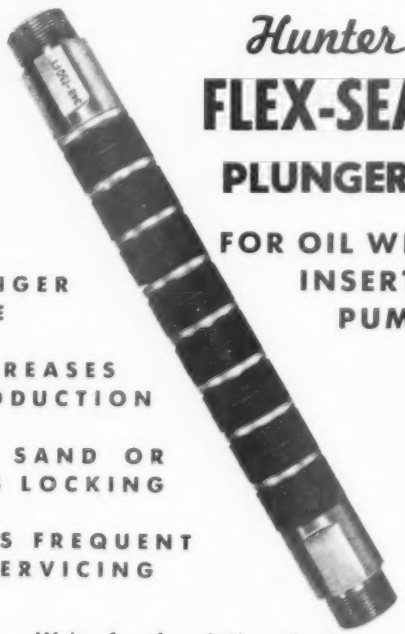

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cated that 28 days were consumed in time on bottom. Circulation losses and inadequate water supply were the principal causes of the wide divergence.

An average trip required 8.1 hours including time spent for rig service and straight-hole surveys. This comparatively long trip time is due to the effect of winter weather severity on drilling-crew efficiency.

Average drilling rate is 107 ft. per day and average completion rate is 67 ft. per day.

Bit consumption . . . On the average, a total of 29.5 bits (9-in. diameter) are required per well. From two to four bits, either 9 or 9⅞-in., have been employed in cutting surface hole from 500 to 1,100 ft. in depth; this operation consumes from 15 to 36 hours.

Bit consumption at Happy Springs field indicates that penetration was not too difficult except near the bottom of the well where three bits were run within 60 ft. Although drilling weights employed were comparatively low, bore-hole deviation tendencies were evident.

Bore-hole practice is to cut a 9 or 9⅞-in. hole throughout. This is reamed out to diameters of from 19 to 26 in. for setting conductor pipe at about 50 ft. Surface hole is reamed out to 13¾ in. for setting a 10¾-in. surface casing to about 600 or 700 ft., depending

TABLE 2—CASING AND CEMENTING PROGRAM, HAPPY SPRINGS FIELD, FREMONT COUNTY, WYOMING

	Csg. diam. (in.)	Csg. seat (ft.)	Cement (sacks)
Frontier Sandstone Completion			
Conductor	18	55	72
Surface	10¾	696	412
Long	7	*5,896	283
		†3,983	
Dakota-Lakota Completion			
Conductor	16	64	105
Surface	10¾	596	406
Long	7	4,711	371

*Practice employed in "A" area. †Practice employed in "B" area.

TABLE 3—DISTRIBUTION OF RIG TIME

Sinclair Oil & Gas Co. 5 Happy Springs Unit, SE SE SE 17-28n-93w, Fremont County, Wyoming

(Source: E. A. Polumbus, Jr., Denver)

Drilling item—	Days	Per cent
On bottom, normal trips, rig service, etc.	28.0	27.1
Coring and reaming	0.6	0.6
Mechanical downtime	3.7	3.6
Mud mixing, hole conditioning, lost circulation, waiting on water	20.3	19.6
Circulating for samples, waiting on orders	1.4	1.3
Drill-stem test	3.6	3.5
Electrical logging survey	0.9	0.9
Weather	0.9	0.9
Casing—reaming, running pipe, waiting on cement time	15.4	14.9
Completion—plug back, swabbing, acidizing, etc.	28.6	27.6
Totals	103.4	100.0

TABLE 4—PENETRATION RATES AND BIT PERFORMANCE
(Data: E. A. Polumbus, Jr., Denver)

Bit diam. (in.)	No. of bits	Footage analyzed	No. of hours	Bit performance: Ft. cut / hour	Bit performance: Ft. cut per bit	Bit performance: Hours on bottom, bit
Drilling						
9⅞	3	750	23.5	31.9	250	7.8
9	25	5,742	431.8	13.3	229	17.3
Reaming						
19¾	1	61	8.0	7.6	61	8.0
15	2	737	25.0	29.5	368	12.5
Coring						
8½	1	8	2.5	3.2	8	2.5

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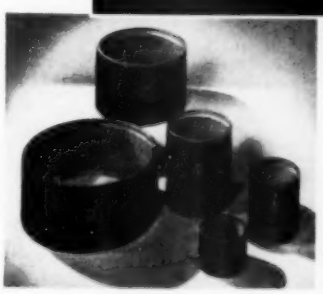

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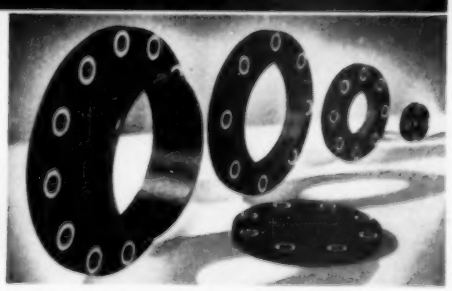

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upon formation objective sought. Long hole is not reamed and the 9-in. size is maintained through the deepest Cretaceous reservoir sought in which a 7-in. production casing is run.

Drill-collar practice . . . Generally, six drill collars are carried on the drilling string. One 7-in. drill collar is made up when spudding and the remainder added when drilling out under the surface casing shoe.

One contractor employs the use of 8¾-in. stabilizers at intervals of 15 and 45 ft. above the drilling bit.

Weight on bit . . . In cutting surface hole, drilling weight including one 7-in. drill collar, is held to slightly less than 2 tons. After shoe is drilled under 10¾-in. surface pipe, weight is stepped up to 6 tons. However, where bore-hole drift becomes excessive, weight is cut back to 2 tons. Generally, a weight on bit of 6 tons is carried through the principal Cretaceous reservoirs.

Penetration Rates

The upper 5,000 ft. of bore hole in the south or "A" area drills fast, i.e., 26.5 ft. per hour; in one well 1,105 ft. of hole was cut in only 21½ hours, or at an average of 49.5 ft. per hour.

The interval from 5,000 to 6,000 ft. drills considerably slower although penetration rate has been recorded of as high as 15 ft. per hour (on-bottom drilling time).

The field has been drilled with a completion rate of 67 ft. per day based on an average of 5.0 ft. per hour in strata having an average dip of about 20° with an average bore-hole deviation of 3½°.

Coring . . . An average of eight cores are cut to evaluate Cretaceous sandstones. However, in one well, 17 Happy Springs Unit, in the southeast quarter of 4-28n-93w, in the "B" area, 17 cores were cut including the Dakota and Lakota reservoirs. On the other hand, two wells are not cored and three Frontier completions had only one core each taken. Usually 7⅞ or 8½-in.-diameter cutter heads are used for coring.

Drill-stem testing . . . Generally eight drill-stem tests are taken on the average well. However, in the discovery well, which tested formations through the Tensleep, 18 drill-stem tests were conducted. Well surveys average four per well; these require less than a single day.

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Division Offices: Denver; Ft. Worth; Houston, Pittsburgh, Tulsa, Torrance

Canada: The National Supply Company, Ltd., 200 F. W. Clark Building, 709 Eighth Avenue, West, Calgary, Alberta

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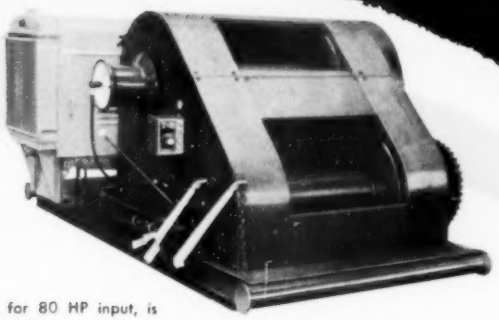
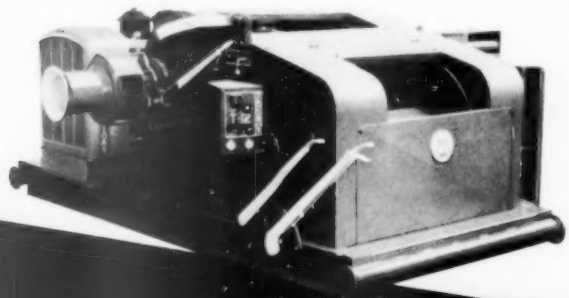
NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

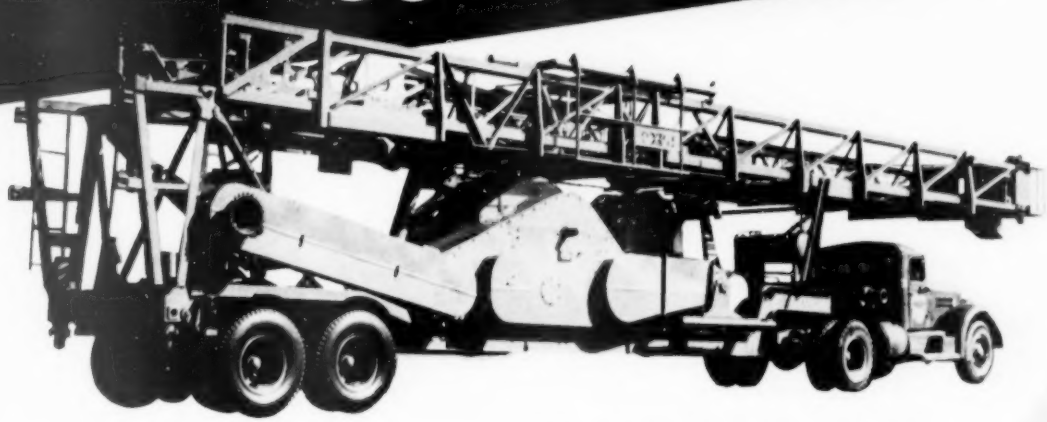


National's Ideal T-8 Hoist, rated for 80 HP input, is ideally suited for truck or skid mounting.

National's Ideal T-12 Hoist, designed for truck or skid mounting, is rated for 120 HP input.

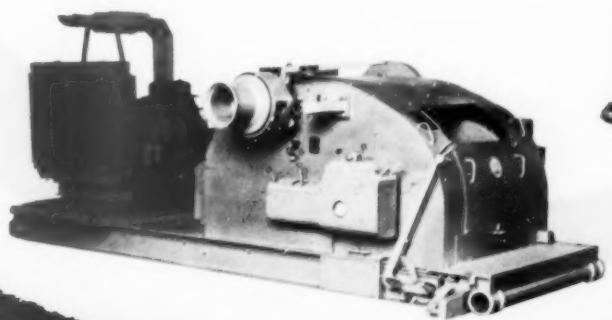


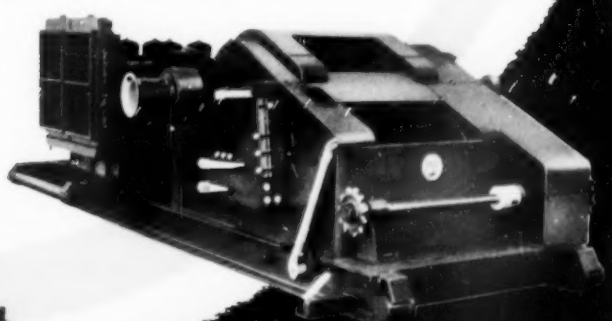
for every job



National's Ideal T-20 Rig, for trailer mounted installation, carries a rating of 200 HP input.

National's Ideal T-32 Rig is one of the largest to offer trailer mounted portability and is rated at 320 HP input.



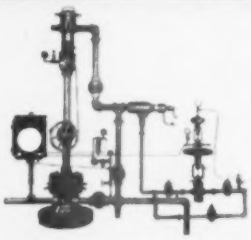


for primary and secondary recovery
by any method

choose from National's complete line of production equipment

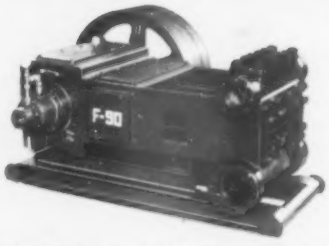
National's Pumping Units are manufactured in 38 standard combinations, API rated from 3200 to 32,400 lbs.

National's Sucker Rods, produced in 3 grades under the most exacting standards in the industry to suit virtually all well conditions.



National's Plunger Lift uses formation pressure for efficiently producing wells where reservoir conditions are suitable.

National Wellhead Equipment, available for practically any completion method at any depth or working pressure in all sizes and types.



National's new F-90 Triplex Pump for water flooding, salt water disposal, oil gathering or as a power-oil source for subsurface hydraulic pumping.

National Supply's continual development of production equipment, over the decades of service to the petroleum industry, has resulted in one of the most complete lines of recovery equipment in the oil country.

Regardless of the recovery methods you choose, be sure to have the complete and profitable facts on the National Blue Line of production equipment. You will find product bulletins available on request at the nearest National Supply Store.

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NATIONAL BLUE PRODUCTS

NATIONAL OIL FIELD MACHINERY AND EQUIPMENT • SPANG STEEL PIPE • SUPERIOR & ATLAS ENGINES

casing for a typical completion is as follows: (14 Happy Springs Unit).

Diam. (in.)	Weight (lb. ft.)	Grade	Range	Length (ft.)
7	23	J-55	2	915
7	20	J-55	2	3,774
Total				4,689

Dual completions . . . Completion settings for dual wells is typified by 13 Happy Springs Unit in which 4,546 ft. of 2⅞-in. o.d. 6.5-lb., J-55 tubing was set above dual completion packer; and 27 ft. of 2⅜-in. 4.7-lb. tubing was run below dual-completion packer.

Tubing practice for single-hole completions calls for running a string of 2⅞-in. o.d. 6.5 J-55 tubing and swinging it at the top of the producing horizon.

Development History

Discovery well of the field was Sinclair Oil & Gas Co. 1 Happy Springs Unit, SE SW SW 16-28n-93w, which was completed on April 11, 1950, as a dual completion from the Muddy and Frontier formations at a plugback depth of 6,590 ft.; originally it tested only water in Tensleep formation penetrated to 10,034 ft. Initial production from Muddy and Frontier sandstones was 131 bbl. oil in 24 hours.

Total field production during May 1953 was 1,503 bbl. daily and cumulative oil recovery to June 1, 1953, was 458,867 bbl. Production has been obtained from the Frontier, Muddy, Dakota; in addition three wells have been completed dually from the Lakota but no oil has been withdrawn from the Lakota reservoir to date.

A total of eight wells are producing from the Frontier. During May 1953 these wells produced 570 bbl. daily on the average. Cumulative recovery from Frontier reservoir to June 1, 1953, was 236,833 bbl.

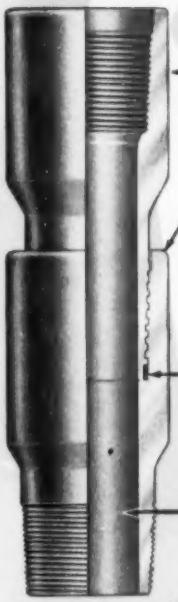
Only one well has been completed in the Muddy sandstone reservoir, the discovery well. During May 1953, it produced only 39 bbl. of oil daily. Cumulative withdrawal from this horizon to June 1, 1953, was 20,313 bbl. of oil.

This reservoir, discovered on February 4, 1952, is now productive from seven wells with a May 1953 average daily production of 894 bbl. Cumulative recovery from this reservoir to June 1, 1953, was 201,721 bbl.

Although three dual completions have been made from the Lakota sandstone reservoir, no oil had been withdrawn from the Lakota as of June 1, 1953. Initial production tests through Lakota in "B" area are as follows:

Well	Oil rate—	Gravity, °A.P.I.
13	455 bbl. per day	36.0
17	315 bbl. in 8 hours	39.0
18	256 bbl. in 24 hours	35.1

Here's the key to a "Free" TUBING STRING


SAME O. D. AS TUBING COUPLING
LEFT-HAND SQUARE THREADS RELEASE EASILY AND POSITIVELY
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You need never worry about freeing your tubing from packers and other devices that sometimes freeze in the hole after prolonged periods of use—not if you've taken the precaution to install a Baker Safety Joint strategically in your tubing string.

BAKER SAFETY JOINT

A few turns to the right unscrews the Baker Safety Joint, freeing your tubing quickly and easily. And you just don't worry about the Baker Safety Joint ever freezing or sticking. It is especially designed to unscrew easily even after long periods of sub-surface exposure.

Precision-matched *left-hand* square threads are of the exact tolerance and taper to ensure positive breaking of the joint. The tough, oil-resistant thread seal effectively protects these threads from corrosive fluids.

YOUR SUPPLY STORE has BAKER SAFETY JOINTS in stock, or will get them for you promptly.

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Gorman-Rupp self-priming centrifugal pumps are especially designed to meet the toughest requirements. The Pelican has many useful applications around a lease and -- it challenges any pump its size and type to equal its performance -- it never quits.

Gorman-Rupp pumps are the **Quickest Priming, Highest Priming, Fastest Pumping** and **Most Reliable** pumps available. *There's a choice of four lightweights for any requirements:*

The Midget 1½" . . . . . Weight 62 lbs. . . . 5500 G.P.H.
The Pelican 2" . . . . . Weight 70 lbs. . . . 7500 G.P.H.
The Hawk 2" . . . . . Weight 110 lbs. . . 10,000 G.P.H.
The Eagle 3" . . . . . Weight 117 lbs. . . 18,000 G.P.H.

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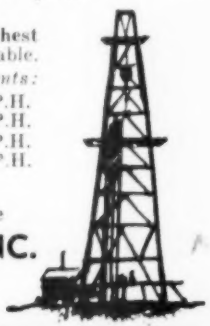

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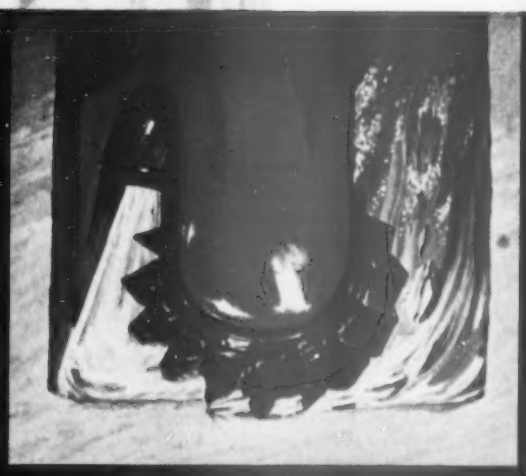

Slush from the nozzles of **REED** Twin-Blast Rock Bits blasts against the bottom of the hole and sweeps across at high velocity — carrying cuttings up into the return mud stream immediately so cutter teeth can work on new formation.

The result of this efficient bottom hole cleaning action is faster drilling, more hole per bit, fewer round trips and lower drilling costs.

4194

REED ROLLER BIT COMPANY

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What are the facts about

LOUISIANA OFFSHORE DRILLING?

In view of the high cost of offshore operations and the relatively low return on investment to date, drilling in the offshore oil and gas lands has been termed the "biggest gamble in the history of oil."

Why do operators continue to spend money offshore in the Gulf of Mexico?

One reason is that geologically the offshore area is equally as promising as the highly productive onshore area adjacent to the Gulf.

An even more important reason was given in the N.P.C. "Submerged Lands Productive Capacity" report:

"All operators who plan to engage in offshore explorations are well aware that these operations are very expensive at present. Their decision to explore on the Continental Shelf is based on the conviction that onshore exploratory work along the Gulf Coast is reaching the point of diminishing returns and that offshore costs will be reduced materially by utilizing the technical 'know-how' gained from large-scale operations, particularly in the development phases of offshore operations."

by Harry Taylor

PRODUCTION from the offshore oil and gas lands in the Gulf of Mexico has not been sufficient to date to warrant the popular conception of "fabulous offshore oil riches" claimed by both federal and state officials in the long controversy over ownership of the lands.

Other considerations, such as extremely high costs of operation, relatively slow return on the high investment, and relatively small proved productive areas add to that picture to make the offshore oil and gas lands seem even less inviting at this time.

What Is Offshore Gross Income?

In the entire history of offshore exploration the offshore oil and gas "riches" in the Gulf of Mexico off Louisiana have amounted to an estimated $66,000,351.13 to the state of Louisiana, through 1952. This is roughly $7,000,000 more than the Louisiana 1952 severance-tax collections on oil and gas production onshore and about $16,000,000 more than the operating oil companies grossed from the offshore production.

State income breakdown . . . Figures obtained from the Louisiana State Mineral Board show that through 1950, on 750 state offshore leases (some 3,008,007 acres), cumulative state income from bonuses for leasing was $26,053,812.59. Presumably no offshore leasing has been done by the state since 1950 when the U. S. Supreme Court declared "paramount rights" over the offshore lands for the federal Government.

Through 1950, according to the mineral board, cumulative state income from rentals paid on the 750 offshore leases was $19,807,467.24, and since 1950 an estimated $600,000 per year has been paid in rentals on a much smaller number of leases.

Another $1,372,395.86 has been paid into the state by the companies as royalties on production through 1952. Also through 1952, another $3,223,321.25 was paid in severance taxes on production from offshore oil and gas production, and $14,372,354.02 was paid in escrow to the United States by lessees in rentals and royalties from disputed lands. Since the first income to the state began in 1937 when the mineral board took its first offshore action, the total income to the state would amount to a maximum possible average of about $4,100,000 per year.

Total severance tax collections on the oil and gas production in Louisiana was $59,628,632.79 in 1952—not quite $7,000,000 less than the estimated total offshore income of $66,000,000 plus.

Offshore income . . . Against the state income can be compared the estimated gross return of $50,000,000 through 1952, to the oil companies operating offshore. That gross income was made on an estimated investment of $260,000,000, a figure which probably has grown to $300,000,000 or more by now. Production this year should add another $25,000,000 to the companies' gross income.

How Many Wells in Louisiana Offshore?

In the history of offshore drilling off Louisiana, through the first 6 months of this year, the companies have drilled 268 wells, of which 154 were oil wells, 36 gas wells, and 78 dry holes, for a total current daily offshore production of 27,521 bbl., and cumulative production, through June 1953, of 23,414,912 bbl.—not a great deal

EXPLORATION DRILLING COSTS BY DEPTHS

(Not including cost of platforms)

Depth, ft.	Directional	Vertical	Land
8,000	$418,000	$290,000	$135,000
9,000	555,000	430,000	155,000
10,000	620,000	490,000	193,000
11,000	650,000	520,000	270,000
12,000	735,000	600,000	335,000
13,000	880,000	740,000	405,000
14,000	1,090,000	940,000	538,000

DEVELOPMENT DRILLING COSTS BY DEPTHS

(Not including cost of platforms)

Depth, ft.	Directional	Vertical	Land
8,000	$440,000	$330,000	$100,000
9,000	495,000	390,000	120,000
10,000	540,000	435,000	160,000
11,000	588,000	470,000	210,000
12,000	660,000	530,000	260,000
13,000	760,000	630,000	310,000
14,000	950,000	810,000	415,000

The author is oil editor of the Shreveport Journal, Shreveport, La.

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E-Z SWABS
THE GREATEST
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Lift fluid safer,
easier, faster

Why these flexible rubbers have given swab lines a new lease on life

Built into the design of the Mission E-Z Swab is a safety relief action which prevents overloads . . . stuck swab . . . broken wire lines . . . expensive tubing jobs.

When the operator tries to pull too much fluid, the Mission E-Z Swab rubber fins bend down and by-pass excess fluid. After the overload is by-passed, Mission E-Z Swab fins spring up until they seal against the tubing. Thus, overloads are automatically by-passed. The flexibility of the fins also allows the swab to pass smoothly through tight spots and paraffin bridges on both the up and down strokes.

Mission E-Z Swabs give better swabbing because they fall faster and give a controlled amount of fluid lift. Each Mission E-Z Swab rubber will lift approximately 400 feet of fluid, and you can select the amount of fluid to be lifted before going in the hole by using one, two or three rubbers. One type Mission E-Z Swab rubber meets all swabbing needs.

Results of thousands of performance runs have now proved beyond any doubt that Mission E-Z Swabs are far superior to any other swab ever before made available to the oil industry. Specify Mission E-Z Swabs at your supply store.

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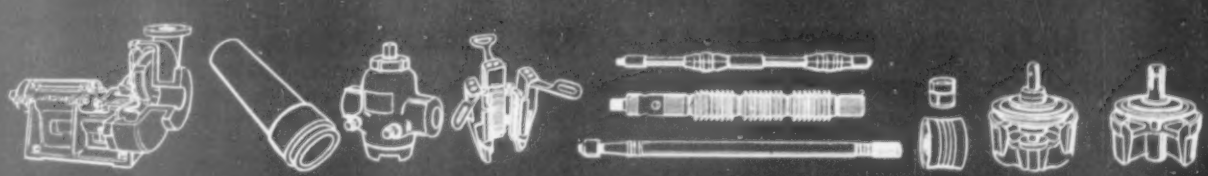
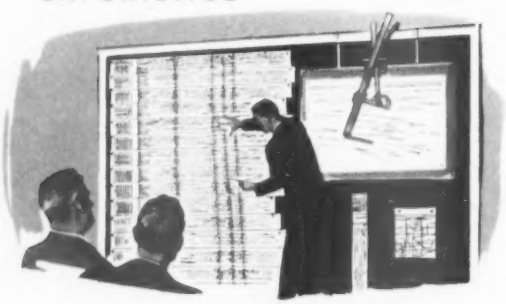
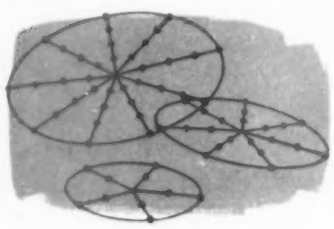


SEI

EXPERIENCE



INTERPRETATION



TECHNIQUE

For twenty-one years, SEI has specialized in sub-surface studies of the domestic oil provinces . . . from Canada to the Gulf. Numerous innovations in instrumentation, interpretation, and field technique have kept SEI in the forefront. For example, in difficult areas, SEI has been a pioneer in the use of patterns of multiple shot holes and geophone arrays.

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more in the entire history offshore than the 19,705,920 bbl. of oil produced in Louisiana in the single month of June 1953.

The National Petroleum Council, in its "Submerged Lands Productive Capacity" report, noted that Breton Sound, Main Pass, and South Pass areas were not considered to be in the offshore waters, but were considered in inland waters. *(The Oil and Gas Journal, June 8, 1953, page 62)* The two fields in the Main Pass area, one in Block 35 and the other in Block 69, are the two largest producing fields offshore, and South Pass Block 24 field is the fourth largest offshore producer. Another field, Bay Marchand, which is the third largest offshore producer, will also probably be declared to lie in inland waters.

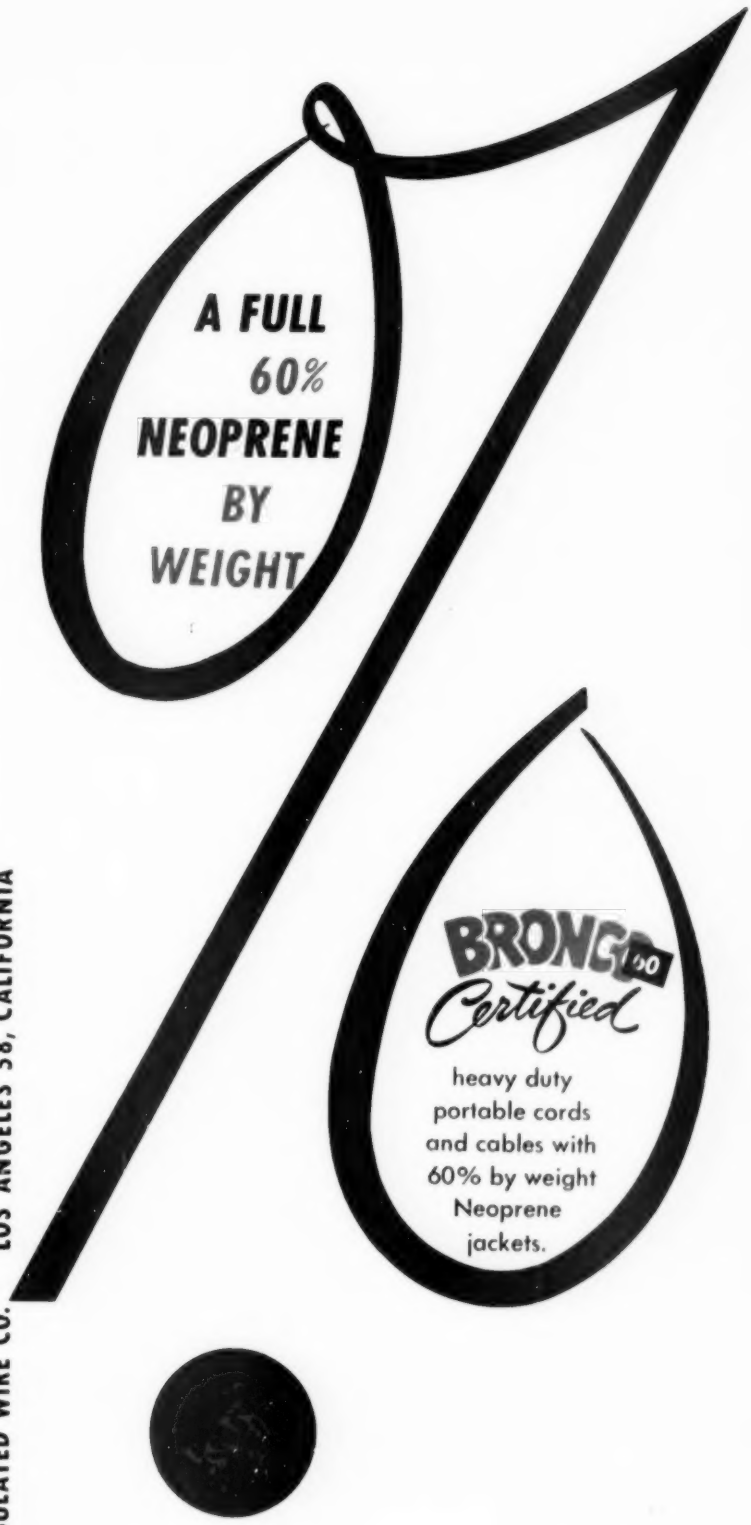
In view of these actions, the actual production in the offshore areas which were declared federal lands or have been contested would be so very small, indeed, that it cannot be said to have any great import except as an indicator of possible productive capacities in the offshore waters. However, for the purpose of figuring costs and returns and other figures on offshore production it might be better to include those submerged-lands oil and gas fields which lie in inland waters within the 3-mile limit as well as those lying outside the 3-mile limit.

What Does an Offshore Wildcat Cost?

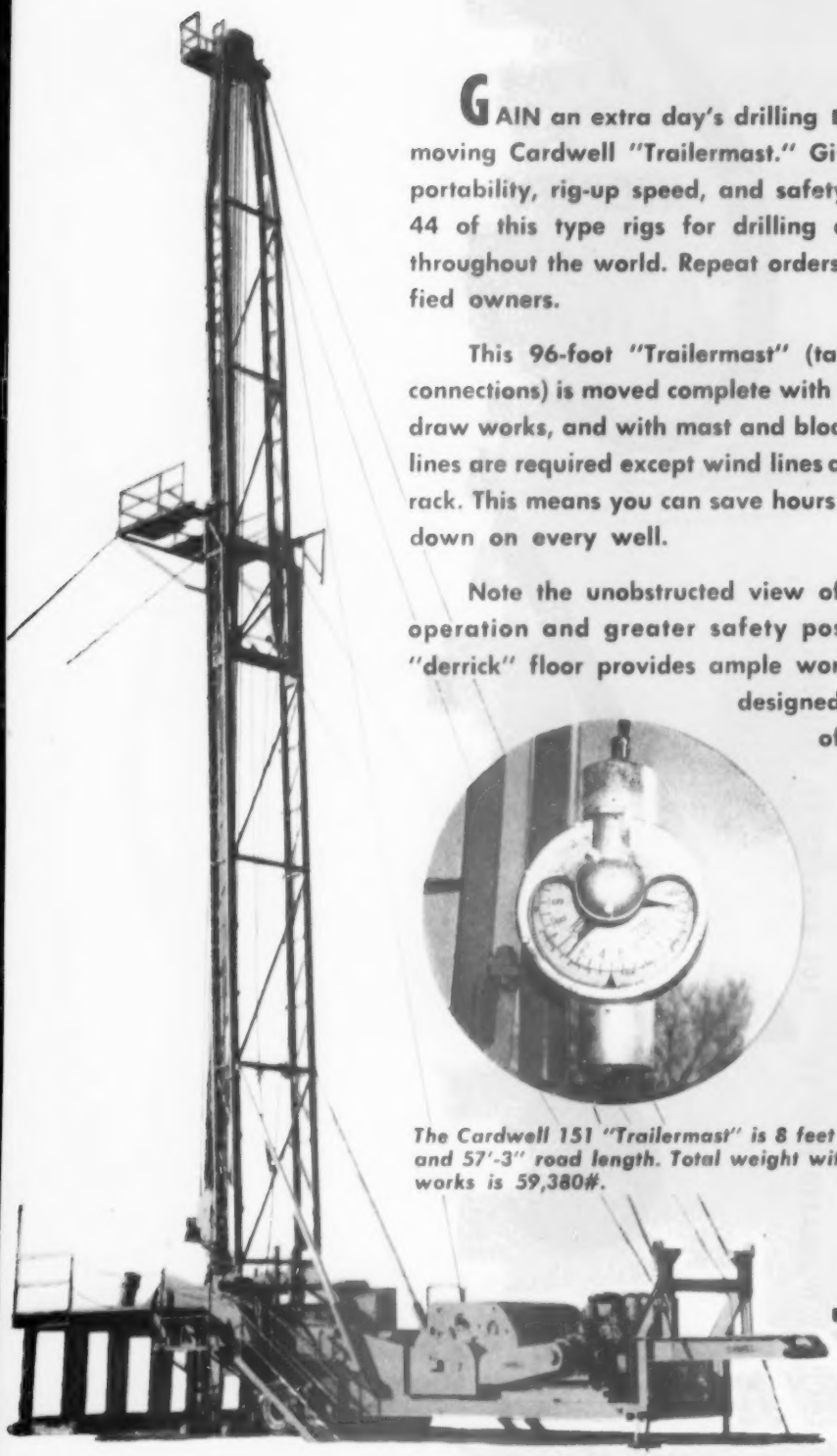
For the 164 successful oil and gas wells developed offshore through 1952 off Louisiana, at the estimated total investment of $260,000,000, the average cost per successful well was $1,590,000, including the costs of dry holes and nonrecurring equipment costs. Of those 164 producers, only 120 were on production at the end of 1952, with a daily per well average production of 192 bbl.

The N.P.C. in its report, noted above, estimated capital expenditure at $5,713,000 for the equipment, needed to drill 10 wells, not including costs of leasing. Included in the cost estimate, which was conservative, was one shore base, six platforms and preparations for drill sites, one drilling tender, three crew boats, one LCT (cargo vessel), one barge, one small tug boat, mooring equipment, communications equipment, and one rig.

That estimated $5,713,000 capital investment for the offshore operations compares with an estimated $872,000 for the same operations onshore—with offshore capital investment running about five to one for onshore investment—resulting in the drilling of 10 wildcat wells. Not included in either of the cost estimates was labor—opera-



The New CARDWELL 151



GAIN an extra day's drilling EVERY week with this fast-moving Cardwell "Trailermast." Gives you the maximum in portability, rig-up speed, and safety. Cardwell has delivered 44 of this type rigs for drilling and workover operations throughout the world. Repeat orders have come in from satisfied owners.

This 96-foot "Trailermast" (tall enough for mousehole connections) is moved complete with a 5,000-foot single engine draw works, and with mast and block fully reeved up. No guy lines are required except wind lines and stabilizing lines to pipe rack. This means you can save hours of rigging up and tearing down on every well.

Note the unobstructed view of the driller makes faster operation and greater safety possible. The big 16' x 16' "derrick" floor provides ample working space. The specially designed trailer eliminates the use of ramps and the substructure permits blowout preventers up to 10 feet high. The "Trailermast" can be used for workover or drilling.

150,000# with eight lines up.

The Cardwell 151 "Trailermast" is 8 feet wide, has 12'-6" road height, and 57'-3" road length. Total weight with double drum Model L draw works is 59,380#.

"TRAILERMAST"

RIG UP AND TEAR DOWN IN MINUTES, NOT HOURS . . .

SELF-SUPPORTING. GUY LINES FOLD WITH MAST . . .

ALL WHEELS ON GROUND—NO RAMP REQUIRED

NOTE: *Portable, One-Piece Substructure.*

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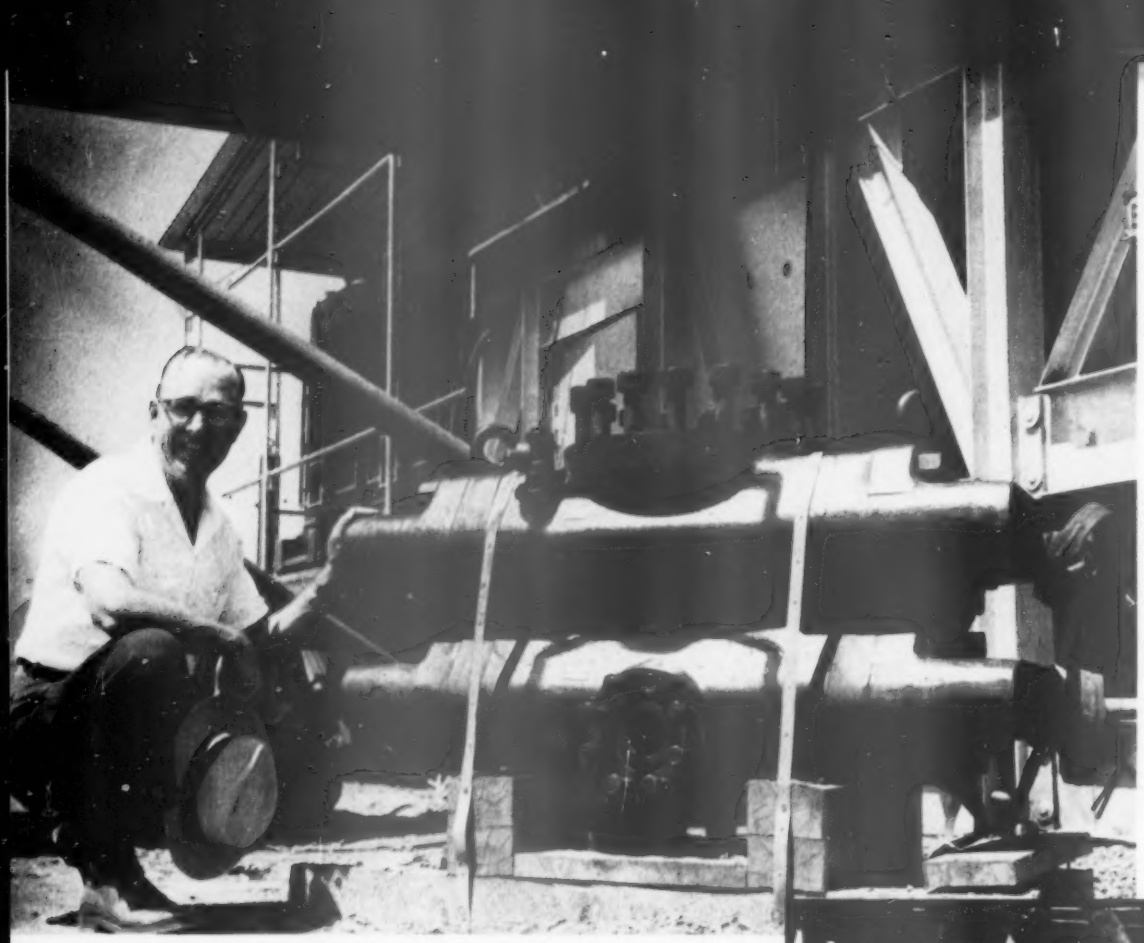

Gene Teer, Division Sales Manager, West Texas-New Mexico Division

AWAY OUT WEST IN TEXAS --

WHERE CELLAR SPACE IS SCARCE

The Cameron Type "SS" (Space Saver) Pressure-Operated Blowout Preventer was designed especially for portable type rigs which have limited space under the derrick floor. Note the compact, streamline design of this new Preventer which provides two sets of rams in a single body. All of the distinctive mechanical features which have made "Cameron" a byword in the field: Quick ram change, full pressure operation for rams and ram changing, self-feeding ram packing, favorable ratio of closing pressure to well pressure — these and many others are incorporated in the "SS" design.

See your nearest Cameron representative for complete details, or literature will be sent gladly on request.

Typical "SS" Preventer installation. Note that only a minimum of cellar space is required.

New enclosed operating unit for all Cameron Pressure-Operated Blowout Preventers (optional equipment) includes air driven pump, 4-way valves, Pressure Gauges, fluid storage tank, and built-in hand pump for emergencies.

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tional, maintenance, transportation, and other costs.

Costs of wildcat drilling, not including the cost of platforms, for directional holes range from $418,000 for an 8,000-ft. hole to $1,090,000 for a 14,000-ft. hole, and for vertical holes from $290,000 for an 8,000-ft. hole to $940,000 for a 14,000-ft. hole. Those cost estimates compare with estimated costs of onshore wildcats, ranging from $135,000 for an 8,000-ft. hole to $538,000 for a 14,000-ft. hole.

Development drilling costs, not including the cost of platforms, range from $440,000 for an 8,000-ft. hole to $950,000 for a 14,000-ft. hole in directional drilling offshore, and from $330,000 for an 8,000-ft. hole to $810,000 for a 14,000-ft. hole in vertical drilling offshore. Those estimates compare with land-development drilling-cost estimates ranging from $100,000 for an 8,000-ft. hole to $415,000 for a 14,000-ft. hole.

Costs of self-contained drilling platforms, which include living quarters for crews, range from $800,000 for a platform built in 20 ft. of water to $1,290,000 for a platform built in 60 ft. of water—currently the maximum operating water depth permitted by present equipment. The self-contained platforms can be salvaged and moved to another location for an estimated cost of about $405,000—or 50 per cent of the original cost. Salvage of the platforms for scrap metal would cost an estimated $100,000 more than the value of the steel in the platform.

For smaller (50 by 100-ft.) platforms to be used with drilling tenders costs range from $203,000 for a platform built in 20 ft. of water to $300,000 for a platform built in 60 ft. of water. About 40 per cent of the platform expenditures are nonrecoverable in the event wells drilled from it are dry holes and the platform is salvaged and moved to another location. Salvaging, moving, and reerection in another location would cost an estimated $175,000, or about 60 per cent of the original cost. Salvage of the smaller platform for scrap would cost about $50,000 more than the value of the steel in it.

While estimated costs for construction of the smaller platforms are less than for the self-contained platforms, there are additional costs in operating it, as well as some of the same costs which would be incurred in the operation of the self-contained platform.

Tenders . . . These are required for the smaller platforms, which are not required for the self-contained platforms, and conversion costs for war-surplus vessels runs from $700,000 to $1,000,000, including the installation of equipment for the YF-type barge, and from

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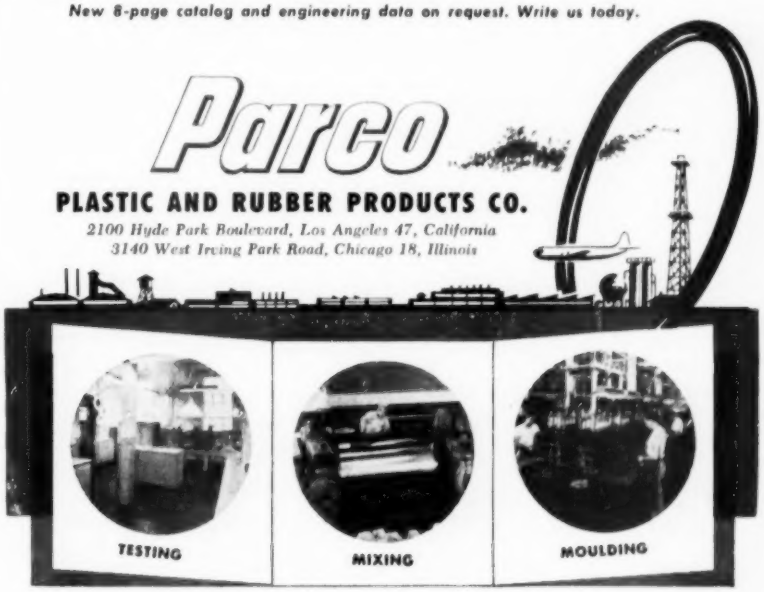

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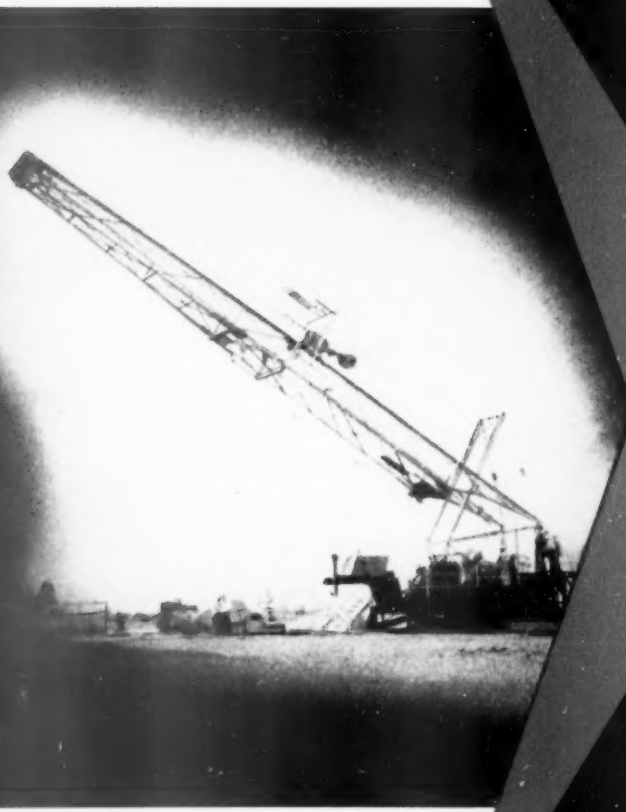

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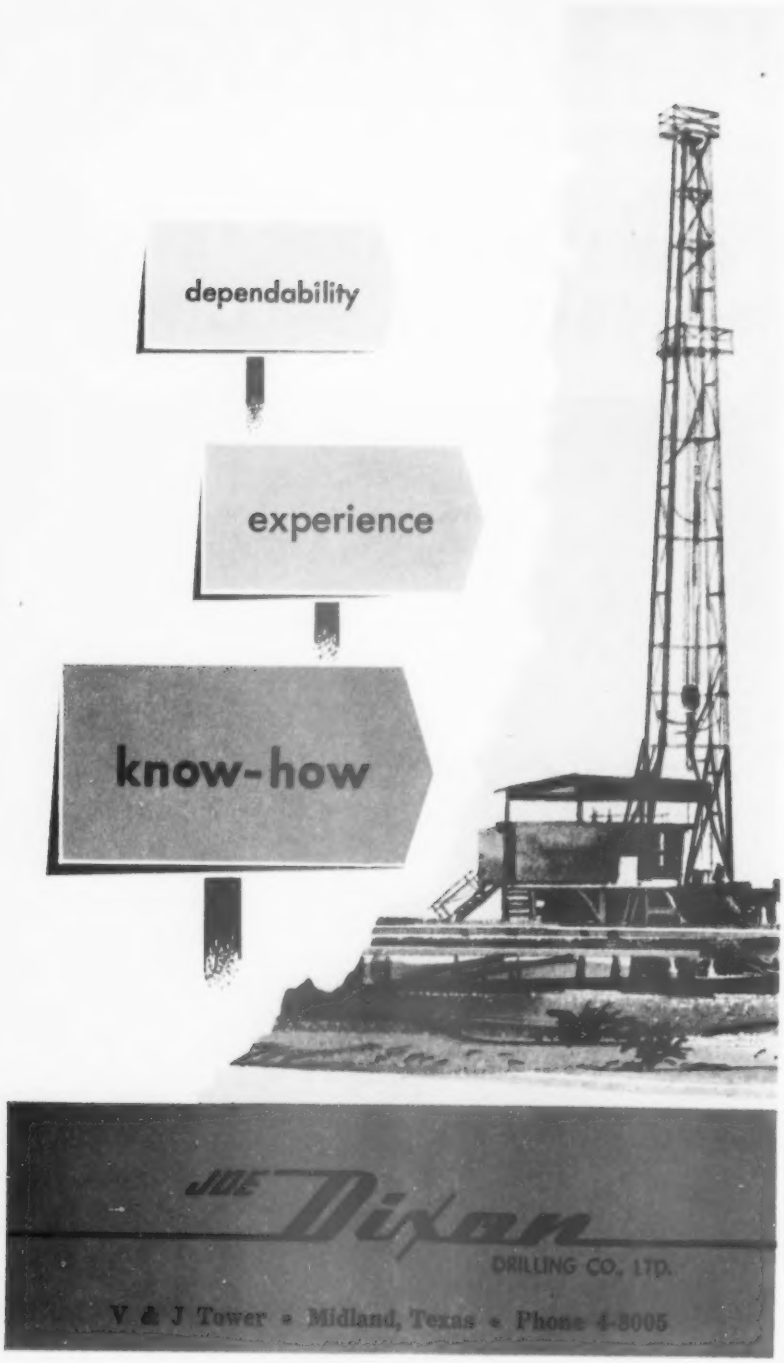

● Rotary drilling for the Permian Basin of Texas and New Mexico ●

$750,000 to $1,500,000 for conversion of the LST-type craft. Most of the war-surplus vessels are no longer available, and some companies are building their own vessels. One company is building a tender which will cost an estimated $2,700,000. Estimated costs of operating drilling tenders range from $1,200 to $2,500 daily, depending on the size of the vessel, size of the crew, and the type of drilling operation.

Crew and cargo vessels . . . Both smaller and self-contained platforms require crew and cargo vessels to service them in addition to the tenders. Crew and cargo vessels for the transport of men and supplies to one offshore wildcat well cost about $1,000,000, with costs ranging from $865,000 to $1,470,000, depending on the size of the vessels used.

Mooring equipment . . . The cost of mooring equipment for use with a tender on one of the smaller platforms would cost about $200,000, including the cost of chain for one location. Not included in this estimate are the additional expenses for spud piling and one or two shots of chain on each piling—and it is uneconomical to recover piling and chain upon completion of the operations at the platform.

Communications equipment . . . A minmum total of $28,560 probably would be needed for tender or platform radar installations, radar on the small boats for crews, for base-station radar, tender or platform radio, radio for the small boats, car radios, and the base-station radio station.

What Are Some Operating Costs?

Daily operating costs for transportation—operation of crew boats and cargo vessels—is estimated at $1,850 for the nonself-propelled tender and $1,350 daily for the self-propelled tender. The estimate includes depreciation, maintenance, fuel, crew, etc.

Drilling . . . Daily operating cost of drilling equipment on the platform ranges from $1,000 to $1,500, including depreciation and maintenance—about 25 per cent higher than for the operation of the same equipment on land. The increased cost is due to the increase in overtime pay for labor, extra supervision, and extra labor costs for maintenance.

Labor costs . . . For an offshore rig these run to about $3,800 per week, compared with labor costs of about $2,300 per week for an onshore operation. Average wage rates run from $2.13 an hour for floor men or roughnecks to $3.13 an hour for drillers.

Common practice is for two six-man crews to work 12-hour shifts for 2 weeks, with a week's layoff while another two crews work. Pay is at straight time for the first 40 hours and time and a half thereafter, giving the crewmen three 84-hour weeks each month for earnings of about $674.34 for roughnecks and $993.34 for drillers.

In addition to the pay, the crews get food and lodging while working, with the typical food bill for 24 men for a single month running to about $720. Also to be considered in the wages is the fact that crews receive their pay while en route to and from the drilling platforms.

How About Geophysical Work?

But before any of the capital expenditures listed above are made, other expenditures must be made for geophysical surveys of the areas to be leased and later drilled.

Gravimeter . . . A 12-man gravimeter crew offshore, including boat personnel, would make, on an average, less than 250 stations per month, at an estimated cost of $120 per station. This compares with a 6-10-man land crew, which would average 600 stations per month, at the estimated average cost of $20 per station.

Seismic . . . A reflection seismic crew offshore will use two to five boats, ranging from 85 to 160 ft. in length, and operating costs will range from an estimated $35,000 to $80,000 per month. This compares with onshore reflection seismic operations which cost an estimated $15,000 per month for a crew operating in the Gulf Coast area. Equipping an offshore reflection seismic crew costs range from an estimated $60,000 to $75,000.

Surveying . . . In connection with geophysical work, another large cost is for surveying work. Surveys for seismic work are generally done by one of three radio survey groups, Shoran, Lorac, or Raydist. It is estimated that the services cost from $7,500 to $8,500 per month for a single user or from $5,000 to $5,500 per month if the user is one of four or more clients.

On this basis, survey costs for geophysical operations in the Gulf of Mexico range from $6,000 to $7,000 per month. This compares with estimated costs ranging from $1,000 to $1,500 per month onshore, depending on the size of the survey party onshore.

What Can Be Projected for the Future?

Using the production and estimated cost figures through 1952, an estimated projected cost and production picture could be derived. If 5 years of unhampered activity could result in

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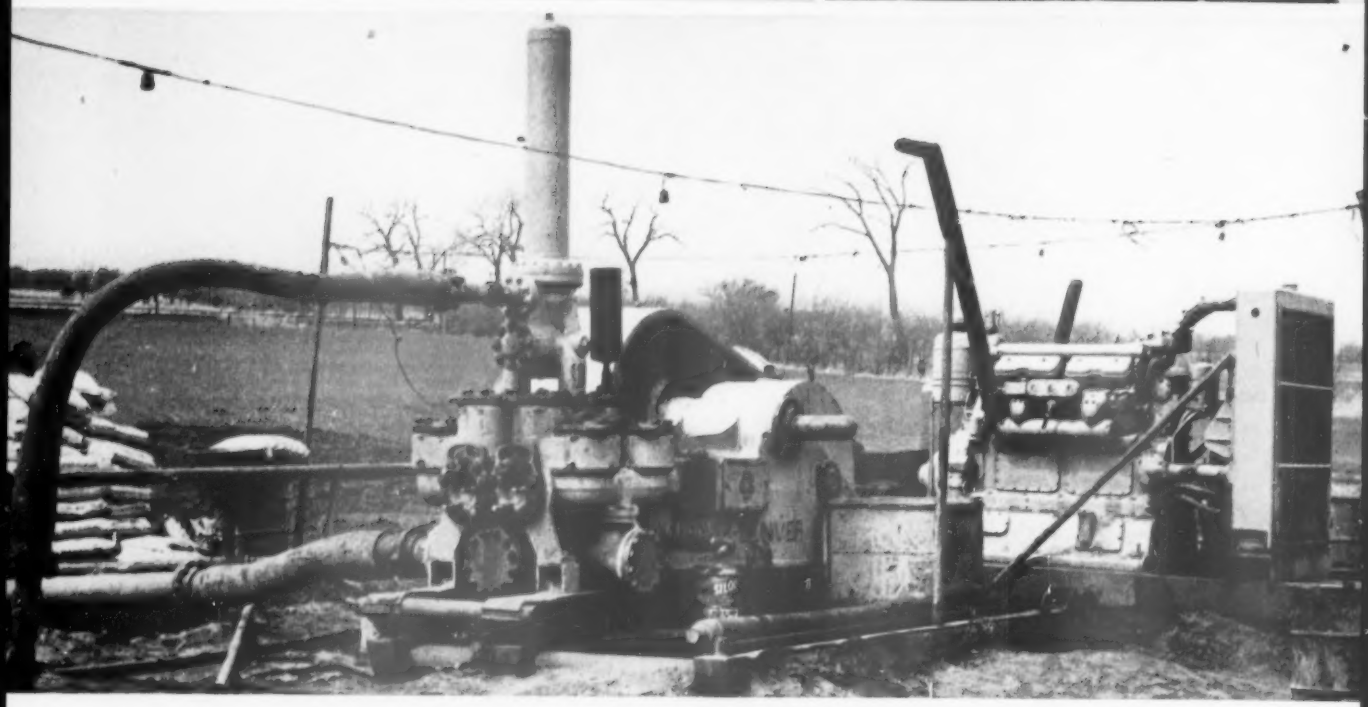

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development of daily production of 200,000 bbl. of oil daily offshore—almost seven times the current production—the wells required to produce that amount of oil, at the current daily per well average rate of very nearly 192 bbl. of oil, would total 1,042 wells or 922 additional wells from the first of 1952—185.4 wells per year, or 107 wells per year more than were drilled in 1950, the most active year to date in Louisiana waters.

The additional wells, at the average cost of $1,590,000 per well (the average cost per successful well for the 164 successful wells completed through 1952 for the estimated investment of $260,000,000) would amount to an estimated projected investment of $1,466,000,000, which, with the $260,000,000 invested through 1952, would amount to a total projected investment of $1,726,000,000.

Total cumulative estimated gross production at the achievement of the projected development, adding 185.4 wells per year with daily producing average rates of 191.99 bbl. per well, would be 235,183,449 bbl.—approximately the production of the state of Louisiana for 1 year. At an average price of $2.65 per barrel (the approximate current value of the generally medium-gravity crudes produced offshore), that estimated projected cumulative offshore production would amount to a gross income of $623,236,139.85.

Net income . . . Figuring with an arbitrary net profit of 50 cents per barrel, the net income off the estimated projected cumulative production would amount to $117,591,725.50 leaving an outstanding investment of $1,608,000,000 to be paid out with an estimated annual projected net income of $36,500,000 on the estimated annual gross production of 73,000,000 bbl. of oil. Net payout time on the still outstanding investment at that rate of net income (figured at 50 cents per barrel net profit) would be 43.5 years.

The N.P.C. estimated that the capital investment for drilling 20 offshore wells, five each of 8,000, 10,000, 12,000, and 14,000-ft. wells, from four platforms with one expanded shore base, would be $14,045,000, compared with $4,980,000 for 20 land wells of the same depths. Offshore production investment costs, including flow lines, production equipment, housing and warehouse, pipe line to shore (30 miles), tank battery, transportation equipment, roads and salt-water disposal, is estimated at $3,387,000, compared with $906,000 for land production investment costs for 20 wells.

Payout time . . . The total estimated investment of $17,432,000 for the 20-well offshore drilling and production program, using the 50 cents per barrel profit figure, would mean that an estimated total production of 1,743,200 barrels of oil would have to be produced by each of the 20 offshore wells to pay off the investment—production of 4,775.86 bbl. daily for a year by each well. At a daily rate of 238.79 bbl., it would take each well 20 years to pay out its investment share on that estimated basis.

The total estimated investment of $4,980,000 for the 20-well land program, using the 50 cents per barrel profit figure, would require an estimated total production of 297,000 bbl. per well to pay out the investment—production of 813.7 bbl. per day for a year by each well. At a daily rate of 203.42 bbl., it would take each land well 4 years to pay out its investment share on that estimated basis—one-fifth of the estimated time required by each offshore well.

The N.P.C. report included an estimate that Gulf of Mexico offshore production, exclusive of the producing areas in inland waters, could be expanded to an estimated 70,000 to 100,000 bbl. of crude oil and natural gas liquids and 600-800 million cubic feet of gas daily. The estimate was

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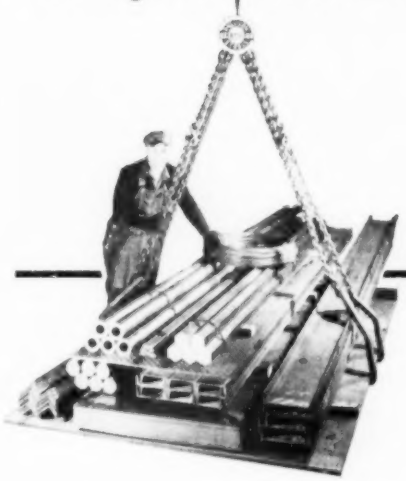

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With the costs of operations offshore being as high as they are and the return on investment as low as it has been, it is evident that the offshore oil and gas lands will continue to be the "biggest gamble in the history of oil."

What About Ownership Controversy?

The continued controversy over ownership of lands lying in certain areas off the Louisiana coast will be one of the contributing factors in that gamble. That controversy is centered on the geographical placement of the state boundary from which the 3-mile jurisdictional limit will be measured under the recently enacted Submerged Lands Act. The state boundary has never been defined more specifically than being "the Gulf of Mexico, including all islands within three leagues of the state in the Gulf of Mexico" in the Act of Admission under which Louisiana entered the Union.

The Continental Shelf area outside the 3-mile limit will also present some complicated problems for the operating companies there, since the recognition of leases granted by the states to the operators has been something of a knotty question. Even more recently enacted legislation has authorized the Secretary of the Interior to administer and lease lands in the federal area with the adoption of conservation measures in effect in the adjoining state areas.

Current activity . . . However, some operators have not been greatly influenced by the dispute insofar as curtailing their operations. Through the first 6 months of this year 36 holes had been completed, 32 of them oil wells, 1 of them a gas well, and 3 of them dry holes. If that rate of drilling is maintained, 1953 will almost reach the record offshore drilling year of 1950 when 78 holes were completed. In 1952, there were 55 holes completed, 38 of them for oil wells—second only to 1950 in that category.

It must be said, however, that a big majority of the offshore drilling in 1952 and this year was developmental drilling in proven fields which will undoubtedly fall in inland waters—solely under state jurisdiction. One exception to that general statement is Eugene Island Block 126 field which lies about 19 miles from the nearest land and about 49 miles south-southwest from Morgan City. July production allowables for the field, which was largely developed in 1951 and 1952, were 2,800 bbl. of oil daily from five wells on production.

Miocene production . . . From the geological standpoint, it appears that oil and gas production in the Gulf of Mexico off Louisiana will most likely be limited to formations of a single geologic series and age—the Miocene. The downward slope and thickening, generally, of Miocene deposits in the Gulf geosyncline area are the limiting factors geologically off Louisiana because of the depth limitations of drilling equipment. About 6 miles from shore off Terrebonne Parish, Kerr-McGee Oil Industries, Inc., drilled the deepest offshore hole at B-1 State Lease 749 in Ship Shoal Block 28 area. It was bottomed at 17,697 feet and was abandoned as a dry hole, never penetrating into the lower Miocene.

First Gas Area

While the first recorded gas well completed for obtaining natural gas was drilled at Fredonia, N. Y., in 1821, it is believed that the first gas area discovered in North America was the Appalachian basin. One of the first wells to bring in natural gas on the North American Continent was drilled in 1820, on the site where the city of Pittsburgh today is located. The well was originally drilled to increase the production of salt for a salt works.

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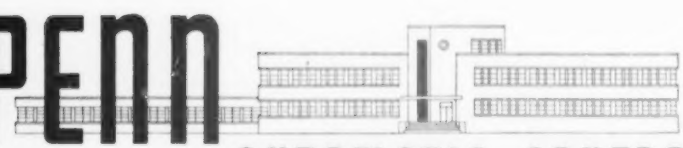

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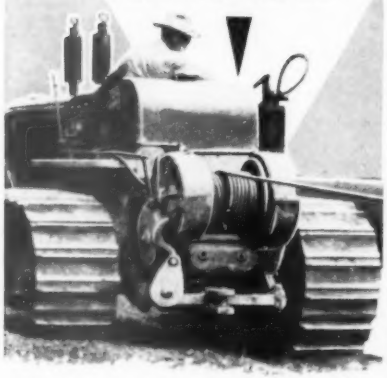

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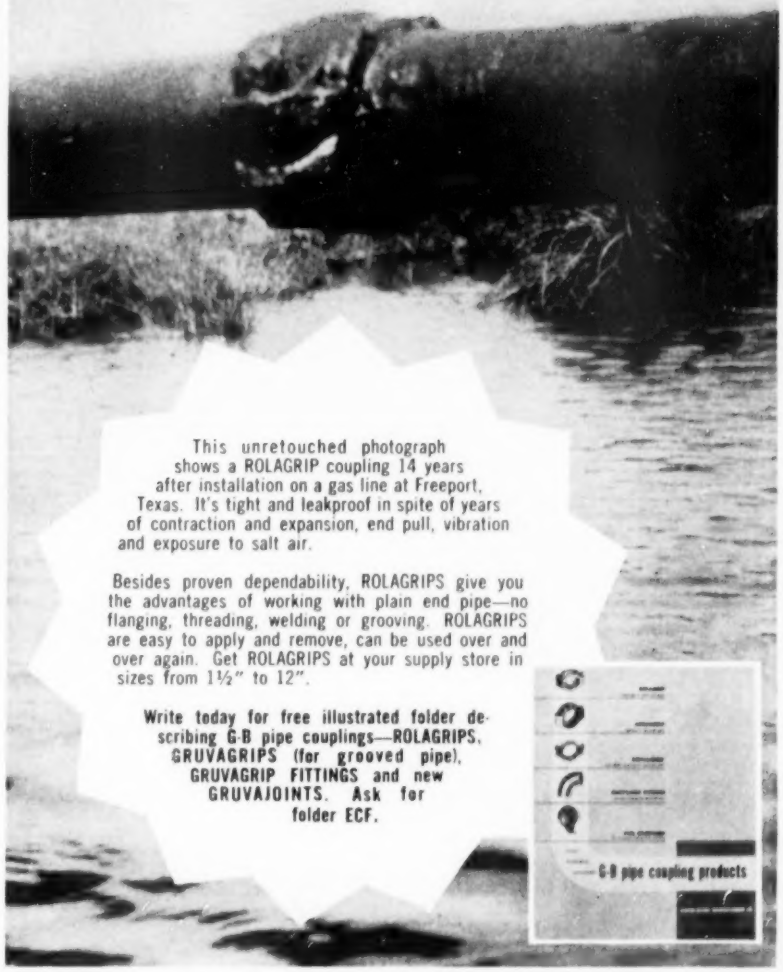

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At depths of 12,000 ft. and below, heavier and more expensive drilling equipment must be used; as the bit penetrates deeper strata, unusual problems not found in shallower drilling are sometimes encountered. Add to these the problems of drilling over water on many occasions and you can soon realize that an operator must use all of his engineering ability to avoid losing his shirt.

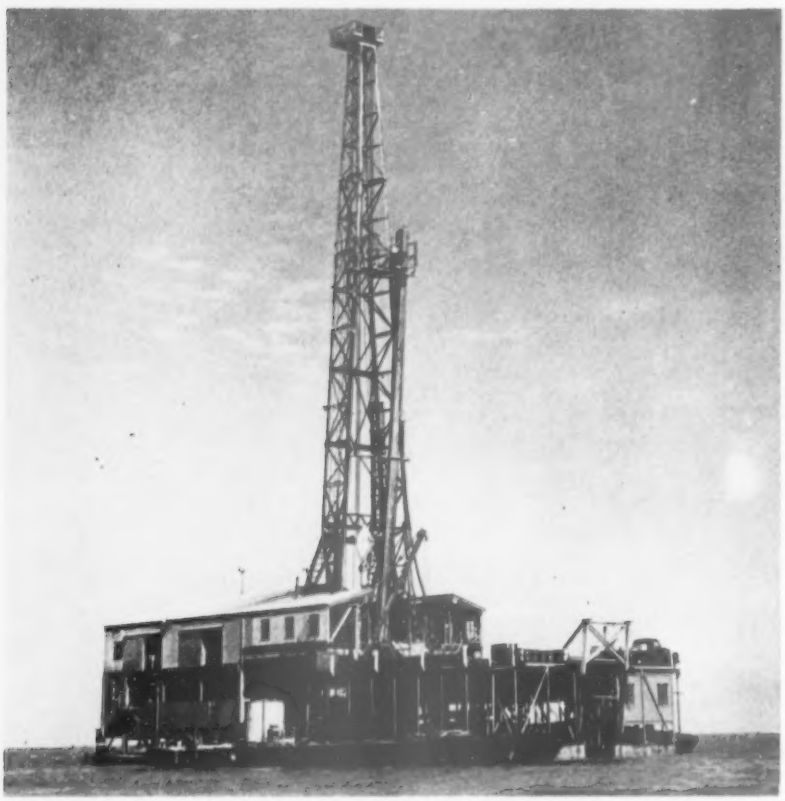
As a result of higher costs, nothing is left undone or treated lightly when it comes to finding new and better ways to drill a hole, save on a mud job, casing job, and testing job.

Here's Why There's a Depletion Allowance

Spending hundreds of thousands of dollars on a single test is not uncommon along the Gulf Coast, where many wells have been drilled below 15,000 ft. Naturally, the initial test of an area usually costs considerably more than succeeding tests, but the reduced costs on later wells can be attributed only to a better understanding by the operator of the difficulties which he knows lie ahead.

One company, for instance, spent more than a million dollars on a deep wildcat venture which ultimately resulted in a dry hole. However, the test was in an area where geologists thought production was likely, so the geological and engineering data gathered are being utilized and some of the drilling practices are being adapted in other wells drilled elsewhere.

Sinking so much money in a dry hole is perhaps one of the best answers to the questions of those outside the oil industry who are always wondering why the Government allows for a 27½ per cent depletion on oil companies' income-tax reports. It should also explain why the price of crude oil had to rise.



DRILLING DEEP WELLS along the Gulf of Mexico is an expensive, time-consuming operation, and even the medium-depth tests (like this one from a barge-mounted rig off the coast of Louisiana drilling for Shell Oil Co.) can run into hundreds of thousands of dollars.

GULF COAST DEEP DRILLING

What It Takes to Drill Those 15,000-Ft. Holes

by William P. Sterne
Gulf Coast District Editor

AS operators along the Gulf Coast drill deeper, costs go higher, and many new difficulties are encountered and have to be overcome.

The success or failure of a test—whether that test finds oil or gas, or whether its dry hole yields valuable geological and drilling data for future study — depends largely on the improved practices and techniques employed at the rig.

Time, skill required . . . A study of detailed drilling reports on a number of deep Gulf Coast wells shows that, in addition to the terrific amount of money involved in various drilling jobs, much time and exceptional skill are required to successfully complete wells at such depths.

A closer look at these drilling reports, which include cost figures, total rig time, type of equipment used, and steps taken to correct various difficulties, will give an idea of just what lengths some operators go to in an effort to add to their proven reserves.

Listed here are drilling data on a few Gulf Coast wells which have been drilled below 15,000 ft.

Florida

In order to test an area in Monroe County, Florida, to depths sufficient to prove or disprove geological theories of the region, Gulf Oil Corp. drilled 1 State of Florida to a depth of 15,455 ft. The test resulted in a dry hole, bottomed in a gray limestone of Lower Cretaceous age. A total of 510 days was required in drilling and completing this well.

Numerous difficulties were encountered, and the hole had to be flushed occasionally with mud to place cuttings in cavernous formations. A total of 12 fishing jobs required 32⅓ days, or 775¼ hours, although the company reports that continued experimentation has since eliminated most of the types

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of fishing difficulties encountered in this particular drilling job.

The well was drilled with a 2,250-hp. draw works, using a 136-ft., 400-ton-capacity derrick. Two mud pumps were sufficient to handle circulation to total depth.

A total of 166 rock bits, varying in size from 8½ to 27 in. in diameter, cut the hole, with average footage per bit around 296. In addition, a total of 1,138¾ hours was spent by crews in taking 175 (1,294 ft.) cores, of which 555 ft. was recovered.

A total of 304 days was spent on bottom, in normal trips, and in rig service; 47½ days in coring, including trips; 57½ days for mechanical down time; 32½ days in fishing; 12¾ days in mixing mud, regaining circulation, and conditioning hole; 5 days for various well surveys; 29¼ days for weather and other difficulties; 26 days for reaming and running casing; and 17 days in completing, including plugging back.

Mud used, including additives, totaled 1,165,582 lb.

A total of 1,476 sacks of cement was required in setting four strings of casing, including 173 ft. of 24-in., 602 ft. of 20-in., 2,985 ft. of 13⅜-in., and 8,027 ft. of 9⅝-in.

Alabama

Humble Oil & Refining Co. completed 1 Emma Williams, in Clarke County, Alabama, as an oil well in the Tuscaloosa, from a plugged-back depth of 5,408-18 ft., and total depth of 15,729 ft.

The company spent a total of 205⅓ days on this test, including 102⅓ days on bottom, normal trips, and rig service; 34 days in taking cores, including trips; 6⅓ days for mechanical down time; 51½ days on fishing jobs; 12 days in mixing mud, regaining lost circulation, and conditioning hole; 5 days on drill-stem testing; 9½ days for surveys; 2 days in reaming and running casing; 3 days waiting on cement to set; and about 35 days in completing and tearing down rig.

A total of 97 bits was used from surface to total depth of 15,729 ft., ranging from 8⅝ to 26 in. in diameter. A total of 1,275 sacks of cement was required in setting the three strings of casing, including 20-in., 13⅜-in., and 9⅝-in.

Five sands, given drill-stem tests from 11,738 up to 6,600 ft., produced salt water. The well was plugged back to 5,440 ft., and 2½-in. casing was set at 5,374 ft. Sixty perforations were made from 5,408-18 ft., and these were acidized with 500 gal.

Dry hole . . . Another Alabama test of Humble resulted in a dry hole, at 15,659 ft. The well, 2 J. R. Williams, in Washington County, was drilled in 233 days, using 187 bits, varying in size from 8⅝ to 26 in. in diameter.

About 12½ days were spent on fishing jobs. Casing program on this test was similar to the other Alabama well, with conductor string of 26-in., surface string of 18½-in., and protection string of 9⅝-in. pipe.

Fifteen days were spent in mixing mud, regaining lost circulation, and conditioning the hole, and 67¼ days were spent in coring, including trips. No core data were released.

Louisiana

Humble 1 Hortense Gonsoulin, in Weeks Island field, Iberia Parish, coastal Louisiana, was completed in the lower Miocene formation as a gas well, with total depth of 17,403 ft. The well showed 192 bbl. of oil plus 4,777,000 cu. ft. of gas per day on initial test through perforations from 17,080-17,113 ft. on a ¼-in. choke. Tubing pressure was 6,050 psi. and flowing pressure 5,400 psi. Producing gas-oil

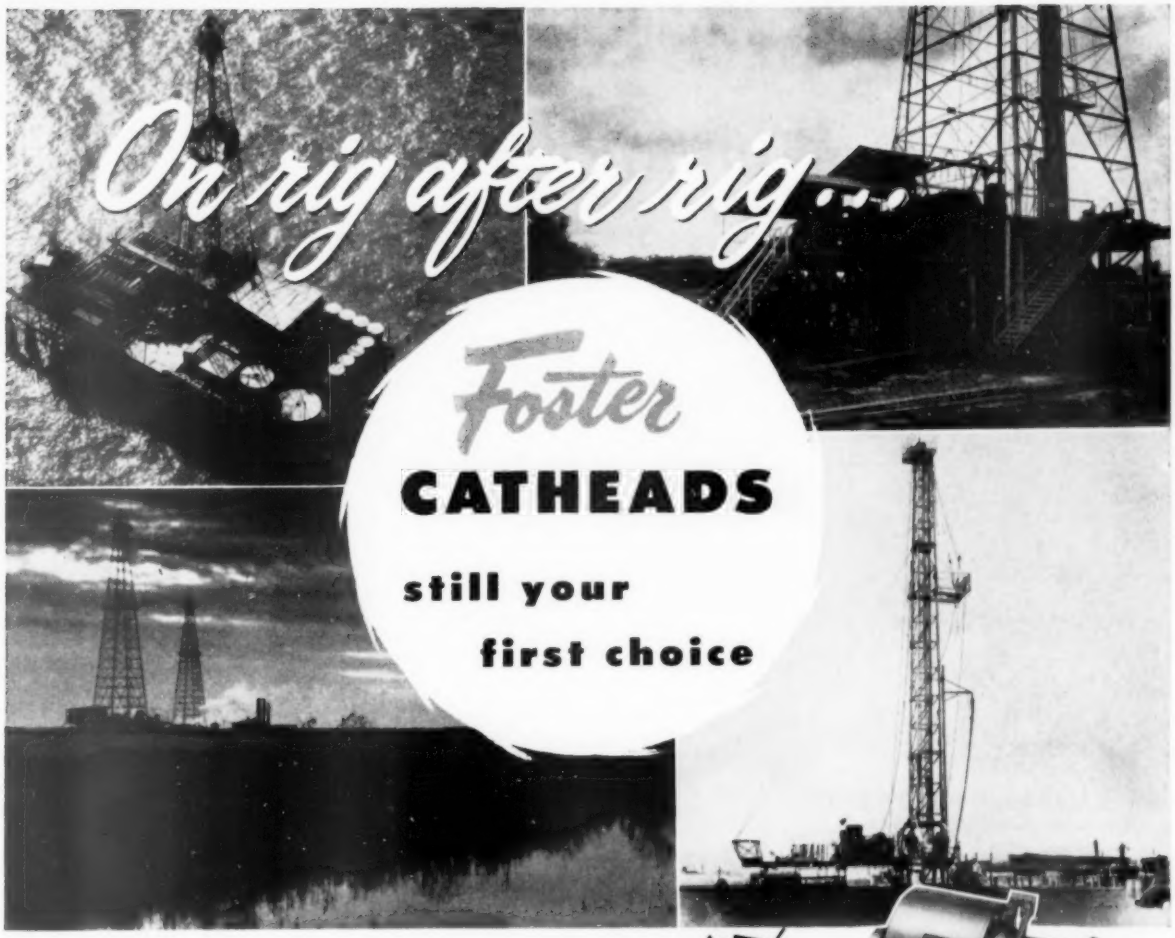
Typical Casing Programs, Deep Gulf Coast Tests

Operator and well—	Casing strings (depth range)	Total cement required, sacks	Total time required, days*
Gulf Oil Corp. 1 State of Florida	4 strings: 173 ft., 24-in. 602 ft., 20-in. 2,985 ft., 13⅜-in. 8,027 ft., 9⅝-in.	1,476	26
Humble Oil & Refining Co. 1 Emma Williams	3 strings: 163 ft., 20-in. 1,819 ft., 13⅜-in. 12,002 ft., 9⅝-in.	1,275	5
Humble Oil & Refining Co. 2 J. R. Williams	3 strings: 66 ft., 20-in. 1,852 ft., 13⅜-in. 8,945 ft., 9⅝-in.	2,140	5
Humble Oil & Refining Co. 1 Hortense Gonsoulin	5 strings: 164 ft., 20-in. 3,025 ft., 13⅜-in. 13,053 ft., 9⅝-in. 16,811 ft., 7-in. 17,330 ft., 5-in.	2,205	7½
Phillips Petroleum Co. 1 Schoeps	4 strings: 80½ ft., 20-in. 3,012 ft., 13⅜-in. 9,569 ft., 9⅝-in. 12,060 ft., 7⅞-in.	2,375	14

*Cementing time included.

Typical Deep-Drilling Ventures on the Gulf Coast

Operator, well, and location—	Total bits used	Depth, ft.	Total time, days
Gulf Oil Corp., 1 State of Florida, Monroe County, Florida	166	15,455	510
Humble Oil & Refining Co., 1 Emma Williams, Clarke County, Alabama	97	15,729	205⅓
Humble Oil & Refining Co., 2 J. R. Williams, Washington County, Alabama	187	15,659	233
Humble Oil & Refining Co., 1 Hortense Gonsoulin, Weeks Island field, Iberia Parish, Louisiana	94	17,403	178
Phillips Petroleum Co., 3 Schoeps, Millican Salt Dome, Brazos County, Texas	169	16,655	354



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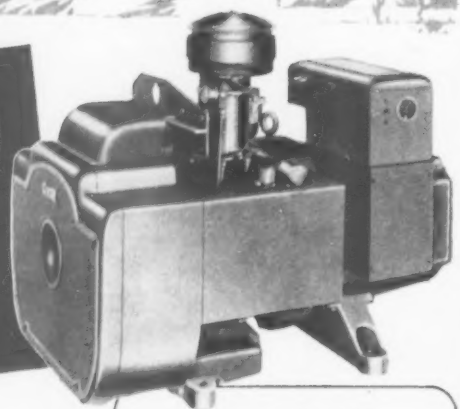

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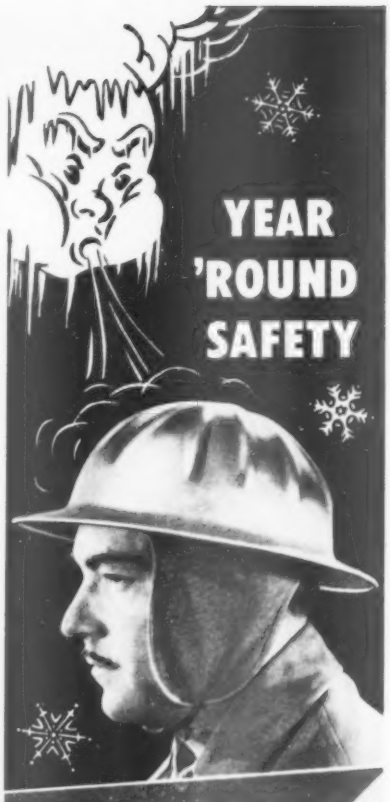

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ratio was 24,920, and gravity of the oil is 44.6°.

Success of this test justified expenses involved, from a payout standpoint. It took crews approximately 178 days to drill from an 185 by 38 by 12-ft. submersible drilling barge.

A total of 95 days was spent on bottom, in normal trips, and rig service. Coring, including trips, took 13.7 days; mechanical down time, 11.2 rays; fishing, 1 day; lost circulation and hole conditioning, 5 days; drill-stem testing 20 days; reaming and running casing, 3 days; waiting for cement to set, 4.3 days; and completing, 19 days.

Five strings of casing were run, including: 164 ft. of 20-in. in a 26-in. hole; to 3,025 ft., 13⅜-in. surface string in an 18½-in. hole; to 13,053 ft., intermediate string of 9⅝-in. in a 12¼-in. hole; to 16,811 ft., intermediate string of 7-in., run in an 8⅝-in. hole; and to 17,330 ft., 5-in. liner in a 6-in. hole. A total of 22,005 sacks of cement was required in setting casing.

A total of 94 bits was used, varying in size from 6 to 26 in. in diameter. Two sizes of jet rock bits were used, thirty 12¼-in. bits from 3,060-13,053 ft.; and forty-six 8⅝-in. bits from 13,053-16,822 ft.

An alkaline-tannate mud was used with an 8 to 10 per cent oil emulsion below 10,000 ft. Maximum mud weight was 10.8 lb. per gallon, and average mud weight, 10.3 lb. per gallon.

Texas

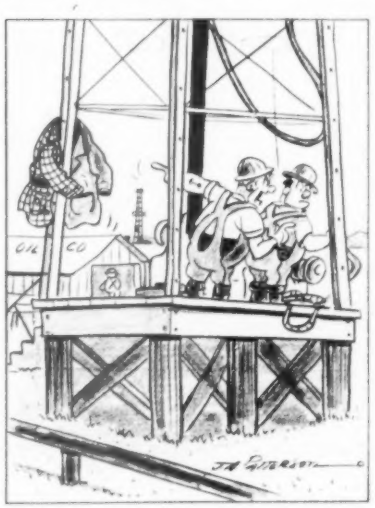
A total of 354 days was spent by crews of Phillips Petroleum Co. in drilling 3 Schoeps on the Millican Salt Dome in Brazos County, Texas. Total depth was 16,655 ft., and hole was plugged and abandoned, after a zone at 11,910-70 ft. was tested unsuccessfully. Deepest formation reached was the Glen Rose, topped at 13,170 ft.

Here is a brief summary of time on this operation:

Rigging up, 14⅓ days; setting 20-in. conductor pipe at 64 ft., and 13⅜-in. casing at 3,012 ft., 25⅔ days; drilling from 3,500 to 9,600 ft. and setting 9⅝-in. casing at 9,531 ft., 96 days, including 17½ days of reaming, 63 days of drilling, 4½ days coring, 3 days waiting on cement, 2 days in mixing mud and conditioning hole, and 6 days for shutdown due to repairs; from 9,600 to 16,655 ft., 152 days total time, including 122½ days of drilling, 8 days coring, ½ day fishing, 14½ days mixing mud and conditioning hole; and 6½ days shutdown for repairs; at total depth of 16,655 ft., including fishing and setting 5½-in. casing at 12,060 ft., 66 days.

A total of 133 rock bits was used, in addition to 27 drag bits and 9 pilot reamers.

The hole was drilled with an 800,000-lb.-capacity derrick, with draw works rated at 1,100 hp. Three mud pumps were used, two 15½ by 8½ by 20, and one 14 by 7 by 18.



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PALOMA DEEP TEST of Ohio Oil Co. was drilled with company rig shown in background. In foreground are part of 5,143 ft. of cores taken from the well.

HOW WORLD'S DEEPEST WELL WAS DRILLED

Test was spudded 2 years ago this month, with objective of evaluating holdings. Former record depth was broken August 20. No serious drilling problems have yet arisen

by D. H. Stormont
California District Editor

OHIO OIL CO.'s deep test in Paloma field 17 miles southwest of Bakersfield, Calif., has now thoroughly established itself as the world's deepest well. At mid-September it was nearing the 21,000-ft. mark, almost 500 ft. deeper than any well ever before had drilled.

Ohio, in taking over the drilled depth record, acquired a banner which had been held continuously by Superior Oil Co. wells for the past 6 years.

In 1946 Pacific Western Oil Co. started a deep test northwest of Bakersfield. When the wildcat, 1 National Royalties, was abandoned in early 1947 it had increased the depth record to 16,668 ft.

Later in 1947, Superior Oil Co. drilled a deep test near Fort Cobb in Caddo County, Oklahoma. It was carried to 17,823 ft. to become temporarily the world's deepest well. In early 1949 the company's 1 Limoneira in the Montalvo area of California broke this record and in March was abandoned at 18,734 ft. Then later that year Superior 1 Pacific Creek Unit, in Sublette County, Wyoming, set a new record of 20,521 ft.

The Paloma test, 72-4 Kern County Land Co. in NE NE 4-32s-26e, was spudded on October 23, 1951, to test deep oil possibilities of the Paloma structure. Particularly it was to evaluate the worth of the company's holdings along the southwest flank of the field. The well was to be drilled without assistance from other companies, although some dry-hole money will be contributed if deep prospects fail to produce.

Based on limited knowledge of the potential deeper pays in the south-central portion of San Joaquin Valley, it was anticipated the Point of Rocks sand, of Eocene age, would be found at about 21,000 ft. Another objective was the Oceanic sand, of Oligocene age.

These two sands are prolific oil producers in the Cymric and Belgian anticline fields on the west side of the valley, about 27 miles northwest of the Paloma test. The Point of Rocks sand is probably also an equivalent of the Eocene sand discovery by Richfield Oil Corp. in April 1952, at Wheeler Ridge, 15 miles southeast.

Relatively little was known about Miocene possibilities below the field's regular Stevens sand, of upper Miocene age. Deepest test on the structure had been Superior Oil Co. 56-35 Anderson on the north flank of the northwest-southeast trending anticline. It was carried to 14,486 ft. before being plugged back for completion in the regular pay.

DRILLER BILL WHITE adds the numeral 2 on the metal housing of the Geolograph.

Deepest test in the area was a 16,246-ft. dry hole Standard Oil Co. of California had drilled in 1945 between South Coles Levee and Elk Hills. This test, about 8 miles northwest of the Paloma well, confirmed the existence of a deep basin southwest of the Coles Levee-Paloma trend. When abandoned it is generally believed to have been in Saucesian shale of lower Miocene age.

A generalized stratigraphic column shows the hole encountered about 1,000 ft. of recent alluvium; Tulare formations and clays of Pleistocene age, 1,000 to 4,200 ft.; San Joaquin formation clays and sands of upper Pliocene

age, 4,200 to 5,700 ft., including the Paloma-Buena Vista Lake gas-producing sands; Etchegoin formation sands and claystones of lower Pliocene age, 5,700 to 8,800 ft.; and Antelope-Stevens formation shale and sands of upper Miocene age (including the field's regular Stevens pay zone), 8,800 to 13,800 ft. From that depth to 20,784 ft., depth at time of writing, Temblor-Vaqueros formations, sands and shales, of middle and lower Miocene age had been encountered.

At about 16,000 ft. the deep test encountered a shale containing bugs which identified it as being Saucesian in the lower Miocene. This call later was believed to be incorrect. It is thought the shale was pseudo-Saucesian; that the materials had been redeposited well above the regular Saucesian. Thus some geologists are wondering if the Standard test likewise did not encounter a similar condition, and if the Eocene is not still deeper than heretofore believed.

Rig description . . . The company-owned rig broke the 20,521-ft. former record last August 20, 668 days after spudding. Other than two fishing jobs,

DRILLER WYATT HARRIS checks a series of diamond bits with a ring gage.

which resulted in a loss of 67 days' drilling time, and trouble from a high-pressure salt-water sand at 13,800 ft., no serious drilling problem was encountered. Company crews were used throughout.

The rig used was not a new one when it was moved onto the Paloma location. Classed as a heavy rig, with 2,000 hp. on the draw works and main mud pumps, it previously had drilled two other holes.

Ohio first used it in 1947 for a deep test in the West Branch field of Ogemaw County, Michigan. This well went to 11,012 ft., the depth record for Michigan, and was abandoned in 1948. Later it was used in drilling a test near Arvin, Calif., which was dry at 13,818 ft.

WEIGHT OF DRILL PIPE at 20,500 ft. places a tremendous load on the 1¼-in. drilling line, as is shown on the weight indicator. Free weight of the entire drilling string at this depth would be approximately 185 tons.

The 164-ft. steel derrick, with a 30-ft. base, is mounted on a 14-ft. 8-in.-high substructure. The engine sub, 9¼ ft. high, supports the 21-ton load of four 350-hp. gas engines and compounds which power the draw works. Another portion of the substructure, 13¼ in. high, supports the draw works weighing more than 38 tons.

The engine and draw-works sub is separate from the derrick substructure so that vibrations from the heavy machinery are not transmitted to the derrick and derrick floor. Legs of the derrick are extended so that the substructure is independent and can be moved in and out. A special safety feature of the substructure is the ease of access to the cellar and blowout-preventer equipment.

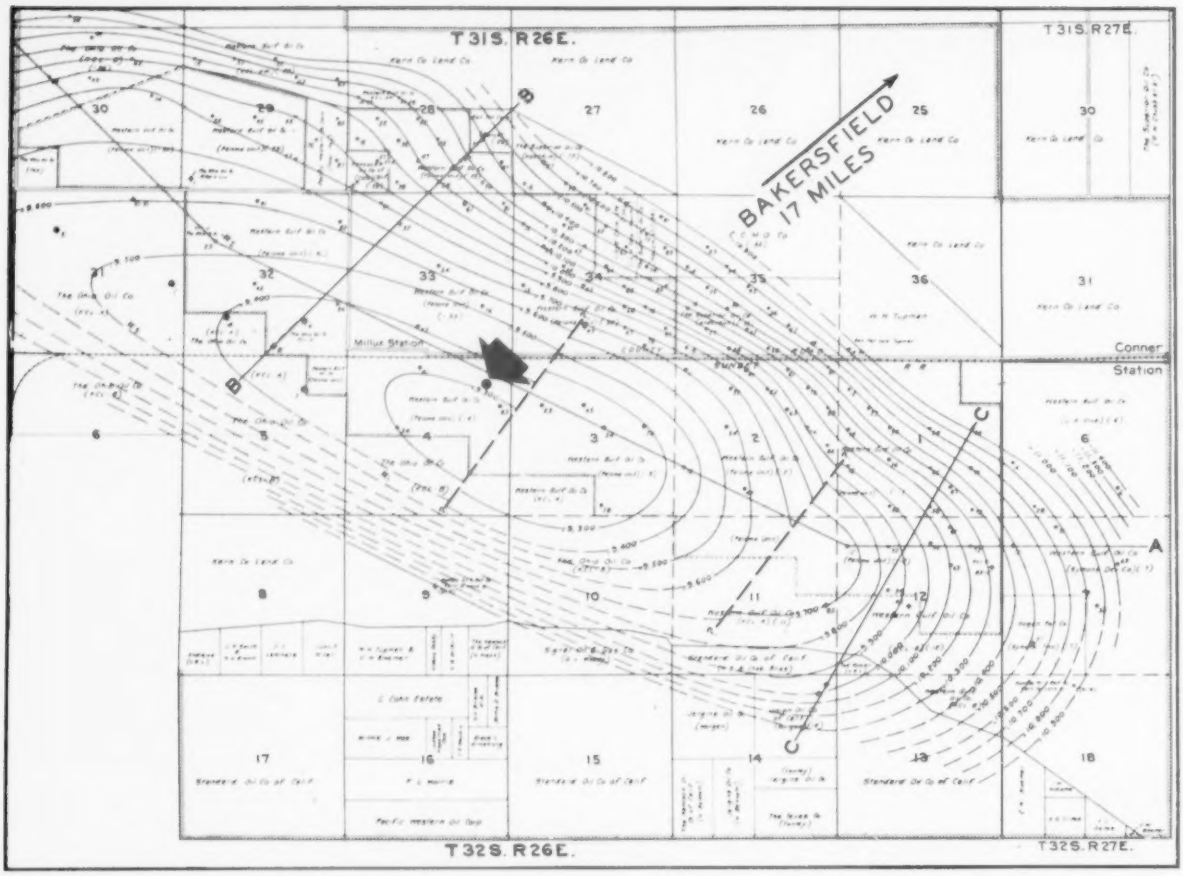
The draw works, like the derrick, crown block, traveling block, and hook can readily hoist and control loads of 300 tons. In drilling to 10,947 ft., where a protective string of 9⅝-in. casing was set, eight lines were strung. Below that depth 10 lines—a 1¼-in. improved plow steel with an independent rope center—have been used.

In addition to the four drilling engines, a 300-hp. twin diesel is used to independently power the rotary through a torque-converter drive. Two gas engines identical to the drilling engines likewise are used to drive auxiliary 250 and 250-hp. mud pumps. An additional 350-hp. pump is driven by the draw-works engines.

Since digging the rathole, the four gas engines on the draw works and the two which drive the pumps have run almost continuously—an estimated 90 per cent of the entire operational time. There have been no major breakdowns.

Blowout Equipment

Blowout equipment includes one all-purpose head and two ram-type heads equipped with dual hydraulic controls. Of the two latter, one is equipped with 4½-in. rams to close around the drill pipe and the other has blind rams for a complete shutoff. The all-purpose preventer will make a shutoff around any size pipe, or can be used for a complete shutoff. A combination string of 4½-in., 17.35-lb.-per-foot, internal flush, integral-joint vanadium steel drill pipe is being used. When drilling at 20,521 ft., about 16,000 ft. of the string was 6⅝-in. o.d. and 3,000 ft. was 16.6 lb. 5¾ in. o.d. full-hole pipe. The remainder above the five 6-in. o.d.,



ARROW MARKS LOCATION of Ohio's deep test in Paloma oil field of Kern County, California. Bakersfield is approximately 17 miles away to the northeast. Contours are shown on "MM" marker.

30-ft. long drill collars was 5¾-in. internal flush tool joints.

Manufacturer and type of the principal equipment used in drilling the deep test are given at the conclusion.

Upper-hole drilling . . . Prior to spudding the deep test, Ohio cemented 18-in. conductor pipe to 61.57 ft. below the kelly bushing. A 12¼-in. hole was drilled and then reamed to 17-in. to the casing point at 1,431 ft., where 13⅜-in., 54.5-lb. casing was cemented with 875 sacks of cement.

A 12¼-in. hole then was carried all the way to 10,947 ft. The interval from 6,670 to 6,765 ft. was cored with an 8½-in. conventional core barrel for the purpose of inspecting a possible gas sand. An electric log was run and the interval from 6,731-65 ft. was tested wet. After testing, this portion of the hole was reamed out to 12¼ in.

On February 5, 1952, what is believed to be one of the heaviest casing strings ever run in California and perhaps in the world was set at the casing point at 10,947 ft. This consisted of 279 joints of 9⅝-in., 43.5, 47.0, and 53.5-lb., N-80 casing, run as follows (top to bottom):

	Ft.	Lb.
5 joints, 53.5 lb.	202.49	10,833
161 joints, 43.5 lb.	6,248.59	271,814
39 joints, 47 lb.	1,502.32	70,609
74 joints, 53.5 lb.	2,999.56	160,476
279 joints	10,952.96	513,732
Landed above kelly bushing, ft.		—5.96
Landed at kelly bushing, ft.		10,947.00

Casing equipment included a float shoe and float collar on the 44-ft. shoe joint as well as 16 scratchers and 6 centralizers on the casing. Running time was 13¼ hours.

The casing was cemented at 10,947 ft. with a 1,000-sack equivalent of 1 to 1 lightweight aggregate, 4 per cent gel and high-temperature cement mixed to 89 lb. per cu. ft. This was followed by 200 sacks of neat high-temperature cement mixed to 116 ft. per cu. ft. Three cement trucks were used. About 50 cu. ft. of water was put behind two top rubber plugs which were bolted together with a magnesium bolt. The cement was measured and displaced with the cement trucks.

After 1¼ hours total displacement time, plugs were bumped at a maximum pressure of 1,500 psi. After 12 hours a temperature survey was run, which indicated the top of the cement to be at 8,400 ft. outside the casing, as compared to the calculated top of 6,400 ft. When drilling out, cement was found to be at 10,892 ft., or 11 ft. above the float collar.

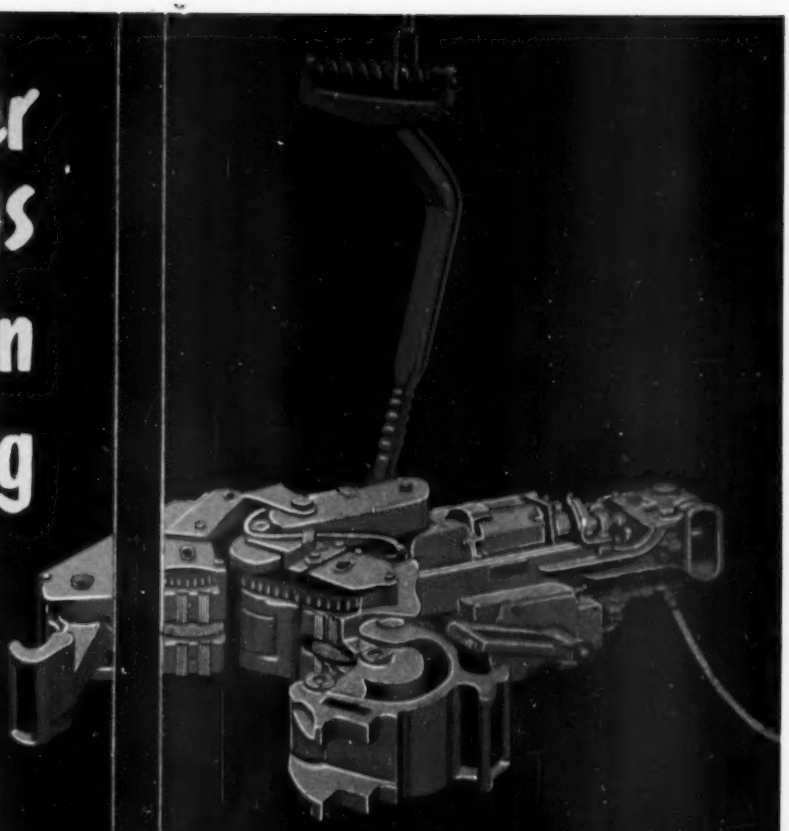
The 9⅝-in. casing was set through the regular Stevens sand so that it would be protected during the drilling of the deeper strata. It was designed strong enough to withstand possible production usage.

In drilling to the casing point, which required 105 days, conventional rock bits were used. A total of 102 bits were required for this portion of the hole. Of the total time spent drilling to this depth, the bit was on bottom 1,062 hours.

Lower-hole drilling . . . Following cementing of the protection string, 8⅜-in. hole was drilled to 10,955 ft. At that depth the mud in the hole was changed from water-clay base to oil-base mud. From there to 10,994 ft., 8⅜-in. hole was continued, and from that depth on down 8¼-in. hole was either drilled or cored.

Drilling below the casing point to a depth of 20,784 ft. required 584 days,

power pays off in drilling



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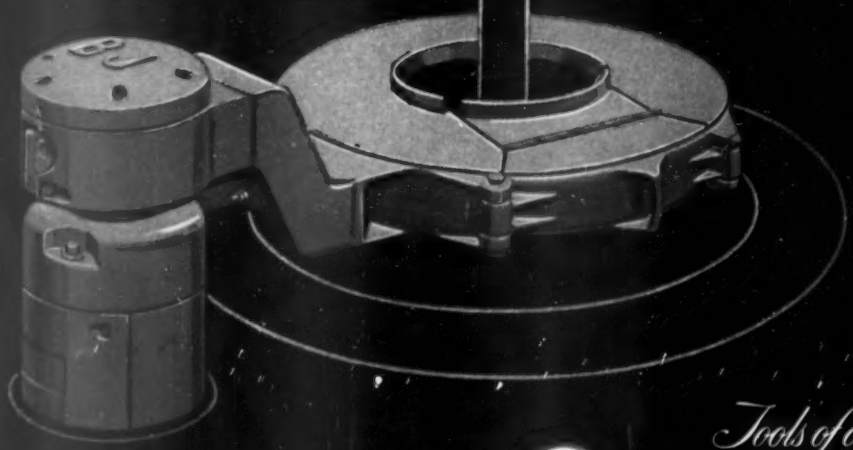

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Two of the three deepest wells in the world were drilled with Black Magic. At 10,955′ in Ohio Oil's record-breaking well at Paloma, Black Magic replaced the clay water mud and was used from that point to the world's new record. On September 1, 1953, the well was drilling below 20,650′. At no time was any trouble encountered which could be attributed to the mud. From Ohio Oil's report, "... use of the oil base mud is believed to have reduced fishing jobs to a minimum." Black Magic was unaffected by the high temperature (Bottom Hole temperature at 20,003′ was 334°F).

The low viscosity of Black Magic permitted lower pump pressure. "At 20,000′ the Ohio Oil Company's deep test was still able to break circulation of the mud with pump pressures of 800 p.s.i. and while drilling at this depth pump pressures were not needed beyond 1,700 p.s.i." Black Magic was weighted to 85 lbs./cu. ft. (11.3#/gal.) at the start but increased to 125 (16.7#/gal.) to kill a salt water flow. Maintenance time was negligible and cost extremely low despite the high flow line temperature which reached 175°F. Accurate electric and radiation logs were obtained at 20,003′. For deep well drilling, switch to Black Magic. Contact your Oil Base representative for details.

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of which the bit was on bottom drilling a total of 8,423 hours. As will be discussed later, almost all drilling was done either with diamond bits or core heads. At the above depth the twenty-fifth diamond bit was in the hole, and 12 core heads had been used. In addition, 11 conventional rock bits had been consumed.

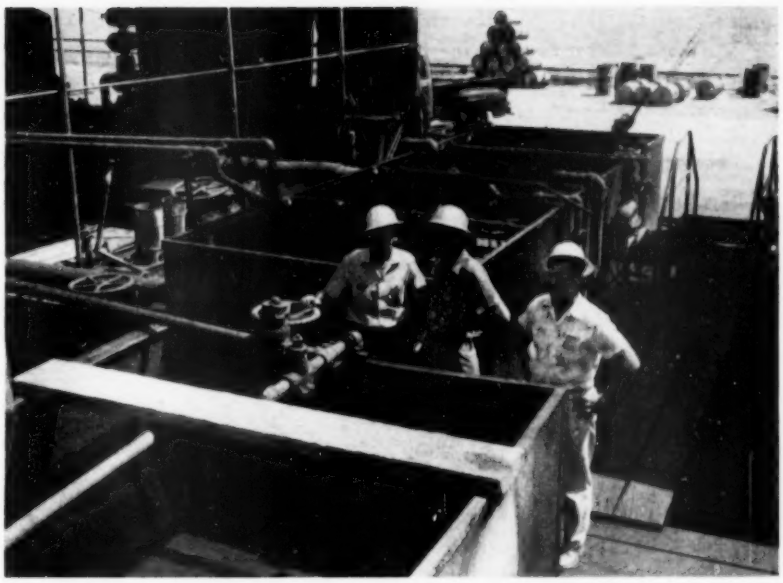
Ohio plans to run a string of 5½-in., 26, 23, and 20-lb., P-105 casing to test the well. If oil shows encountered below 20,784 ft., possibly in Oligocene or Eocene sands, are sufficiently encouraging to warrant running pipe to that depth, it would establish a new casing length record. Superior at its deep Wyoming test set 19,765 ft. of 7-in. casing. If no deeper shows materialize, hole will be plugged back and the 5½-in. string run. Minor up-the-hole showings then will be tested through perforations.

Deep coring . . . An interesting feature in drilling the deep hole was the exceptional amount of coring performed. Nearly continuous coring was initiated at 13,877 ft. and continued to 20,035 ft. No coring has been performed since late July, or at the 20,035 to 20,784-ft. interval.

A total of 130 cores were cut. These totaled 5,143 ft., of which 95 ft. were cut with conventional core bits and the remainder with diamond core heads. Of the total number of cores only 11, or 271 ft., were taken above 13,877 ft. Of the cores obtained, 81 have been analyzed.

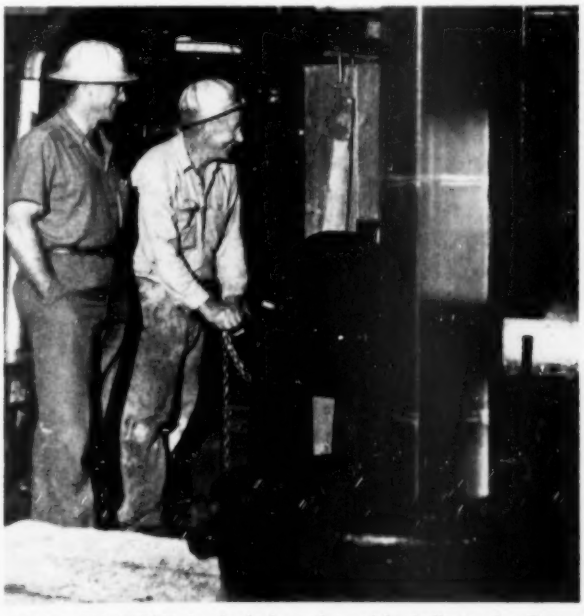
In the case of diamond drilling bits, some operated on bottom for as long as 7 days at a time. Generally speaking their rate of penetration, and that of the diamond core heads, was about 1 ft. per hour in shale and 2 to 3 ft. per hour in sandstone. Below the field's regular pay, about 49 per cent of the section penetrated was tight sandstone. Most of the remainder was compacted, hard shales.

To check on the penetration rate of the diamond bits, occasionally a conventional rock bit was run. These were used to cut 92 ft. of hole below 10,947 ft. In comparison to the average of several days on bottom given by diamond bits, a maximum of 11 hours on bottom was given by any of the 11 rock bits. As round-trip time steadily increased from 6½ hours at 13,877 ft.



OUTSTANDING PERFORMANCE of oil-base mud was instrumental in success of the Ohio deep test. Standing beside the mud tanks are "Curly" Doane (left), Ohio drilling superintendent, Charley Piskac (center) and Al Seaman, Oil Base, Inc., engineers.

WIRE LINE held by Derrick Man Clarence Craig is cut by Rotary Helper Bert Calhoun. While drilling between 15,000 and 16,000 ft., line was moved 3 to 5 ft. after every round trip and line was cut 100 ft. or more after every fourth round trip. Below 16,000 ft., line was cut 100 ft. or more at every round trip.

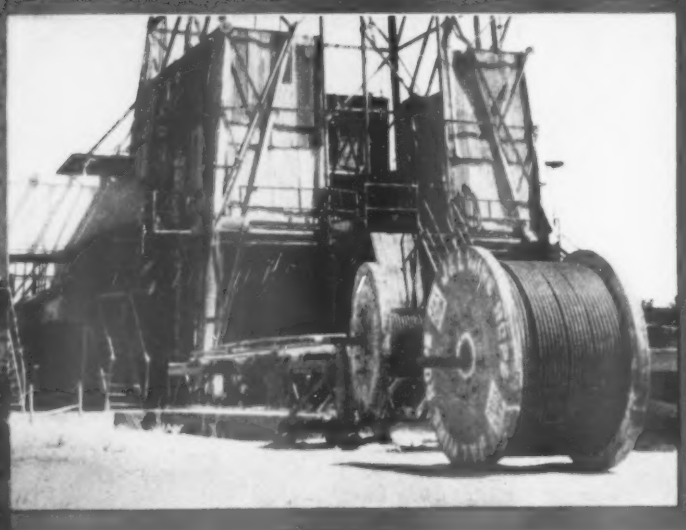


LOAD ON HOOK is checked at the weight indicator by Rotary Drilling Foreman Jack Weaver; Driller Fred Ryan, with hand on brake, feeds off drill pipe. The heavy oil-base mud used gave the drilling string in the hole a buoyancy, lightening the load on the hook.

the World's

The Ohio Oil Company breaks world's record for deep drilling

a new



Record LOW in Drilling

Ohio's bit is below the 20,521 foot mark

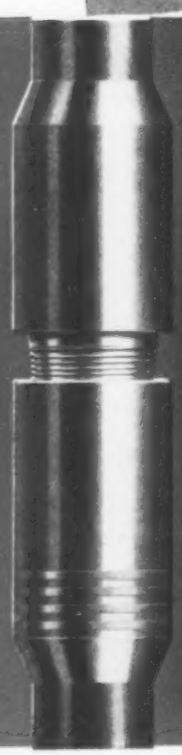
At 12:45 P.M., August 20, 1953, Ohio's diamond bit passed the 20,521-foot mark in its test well in the Paloma Field near Bakersfield, California.

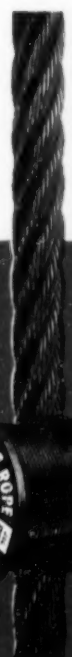
The Ohio well is approaching the formations of the Eocene epoch, the time dim in the earth's geologic history possibly some 70,000,000 years ago.

The Eocene is a highly-productive pay horizon in some of the Southern San Joaquin Valley fields, where the Ohio exploratory well is being put down about 15 miles southeast of Bakersfield. Present plans of The Ohio Oil Company, which is based at Findlay, Ohio, are to continue drilling, hoping to make the test well the world's deepest producer.

Jones & Laughlin Steel Corporation's Wire Rope and Seamless Pipe played vital parts in helping The Ohio Oil Company set their new world's record.

HIGH in Service...





J & L's Seamless Pipe and Wire Rope withstand the severest tests

Here's the record:

Drill Pipe Used in the Ohio Rig

J&L 4½" Seamless Integral Joint Blue Ribbon Vanadium Drill Pipe.

The top joint in the string carried a suspended load of 155 tons. The upper 15,000 feet of the 21,000-foot string, or that section carrying the greatest load, is J&L 4½" Seamless Integral Joint Blue Ribbon Vanadium Drill Pipe.

This grade of drill pipe, having 105,000 psi minimum yield strength, has been developed by J&L in answer to the increasing need for higher strength steels.

Wire Rope Used in the Ohio Rig

J&L 1⅛" Improved Plow Steel Wire Rope with an independent wire rope center.

The drilling line has withstood the severest tests ever given a 1⅛" line in the history of the oil fields.

There have been no accidents and no trouble with the wire rope from spudding-in to the passing of the 20,521-foot mark.

In setting the casing, the 1⅛" line was called on to support the longest string of 9⅝" casing ever set in an oil well.

The 1¼" wire rope supported over a half million pounds of 9⅝" casing.

J&L STEEL

When conditions are toughest... you can depend upon J & L for those extras in exceptional service.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH

to 11 hours below 20,000 ft., the diamond bits thus permitted a much greater time on bottom.

In addition to the cores and a rate of penetration log, six electric and radiation logs were taken below the casing point as an aid in evaluating the formations encountered. All were taken with oil-base mud in the hole. They were as follows:

1. Monoelectrode resistivity and natural potential log, 10,947 to 16,737 ft.
2. Gamma ray log, 8,000 to 17,732 ft.
3. Induction log, 10,947 to 20,003 ft.
4. Gamma ray log, 11,000 to 20,003 ft.
5. Neutron log, 11,000 to 20,000 ft.
6. Scratcher resistivity and natural potential log, 10,947 to 19,049 ft.

An important factor in the well's comparative freedom from trouble was the relatively straight hole maintained. Because of the necessity for a whipstocking job at 16,495 ft., however, a considerable dog leg was made. Deviation from vertical was surveyed each time a bit was to be pulled, using a Totco single-shot instrument.

Mud program . . . Use of oil-base mud is believed to have reduced fishing jobs to a minimum during the drilling below the 9⅝-in. casing point. Despite the extreme depth, large amount of open hole, very high flow-line temperatures, a continuous battle with lost circulation, and substantial gas loading after trips, mud costs are thought to have been relatively low.

At 20,000 ft. the deep test was still able to break mud circulation with pump pressures of 800 psi. While drilling at that depth, pump pressures of 1,700 psi. were sufficient.

When the water-clay mud was displaced with Black Magic at 10,955 ft., a mud weight of about 79 lb. per cu. ft. (10.6 lb. per gal.) was used, with a funnel viscosity of 120 seconds A.P.I. Mud weight was gradually increased to 87 lb. per cu. ft. (11.7 per gal.) At this point the hole started taking mud so that it was necessary to reduce the weight to 85 lb. (11.3 lb. per gal.).

Mud was maintained at this weight until at 13,818 ft. the bit drilled into a hot salt-water sand which flowed 7 to 21 bbl. per hour. To control the flow it was necessary to shut in the well while the mud weight was built up. Mud weighing 125 lb. per cu. ft. (16.7 per gal.) was required before the salt-water flow was completely killed. At this weight the formation was taking considerable mud. It was necessary to reduce it to 117 lb. per cu. ft. (15.65 lb. per gal.) in order to maintain full circulation.

Since killing the salt-water flow—or from 13,818 ft. on down—mud weight has been closely watched and maintained between 115 and 117 lb. per cu. ft. Even with this rigid maintenance program the formation will take mud on occasion, particularly when a new sand section is drilled. The mud returns from bottom after trips are always heavily gas laden at the flow line, but by the time the mud reaches the pits it is back to normal weight.

In addition to the lost-circulation problem, temperatures encountered are high. Bottom-hole temperature at 20,003 ft. was 334° F., with the hole static for 28 hours.

Mud flow-line temperatures were correspondingly high. At about 12,700 ft. the flow-line temperature was 156° F. It climbed to 171° F. at 13,500 ft., just above where the high-pressure salt water was encountered. Since that time there has been a gradual increase until at 20,700 ft. it was approximately 176° F.

Despite these troubles, the hole was in excellent condition when the new depth record was established. As an example of its condition, in the early part of July a diamond bit was run continuously on bottom for 7 days (making 190 ft. of hole in 168 hours). When the bit was pulled no tight spots were encountered, despite the high temperatures involved and the large amount of sand section in the 8,700 ft. of open hole. Earlier, while preparing to drill off the whipstock at 16,495 ft., the bit was off bottom for as much as 3 or 4 days. In all cases it was possible to again lower the bit to bottom without difficulty.

A more recent example of the hole's condition occurred a few days after the depth record had been broken. While drilling at 20,580 ft. the drill string parted about 40 joints off bottom. Due to the extreme depth, it required approximately 14 hours to get back in the hole with fishing tools. Despite the delay, when the fish was latched onto and circulation broken with 900 psi. pressure, only a slight pull was required to unseat the fish and pull it from the hole.

Fishing jobs . . . Other than this minor difficulty, only two fishing jobs of major importance occurred. While reaming the hole preparatory to running the 9⅝-in. casing, and before the use of oil-base mud the drill pipe was stuck at 7,872 ft. The pipe was backed off one joint above the drill collars, leaving them and the bit in the hole.

After going in with socket and jars, and unsuccessfully jarring on the fish, cutters were run and a 15-ft. cut made on the 5 9/16-in. drill pipe. A packoff socket was run, and after unsuccessful attempts to spot oil around the remaining fish, or to back off the drill collars above the bit with the aid of string shots, the fish was recovered by first washing over with 9⅝-in. wash-pipe and an 11¾-in. washover shoe, and then fishing with socket and jars. Time spent for the fishing job was 13 days.

On November 20, 1952, at a depth of 16,495 ft., a complete 54-ft. core had been taken and the driller was preparing to come out of the hole when the pipe was stuck.

Full circulation was maintained. Jarring was started with 15-ton blows then gradually increased to 50-ton blows over a period of 4 days, with actual jarring time being 40 hours. As a safety precaution, the drilling line was moved slightly every 3 hours while jarring.

When this program failed, the drill pipe and drill collars were backed off above the core barrel and attempts to sidetrack the fish were made. After several attempts to adapt the whipstock so that it would fit over the top of the core-barrel fish, and thus not be deflected after the hole was sidetracked, the job was successfully performed. Total elapsed time from sticking of the core barrel to regaining the previous depth of 16,495 ft. was 54 days.

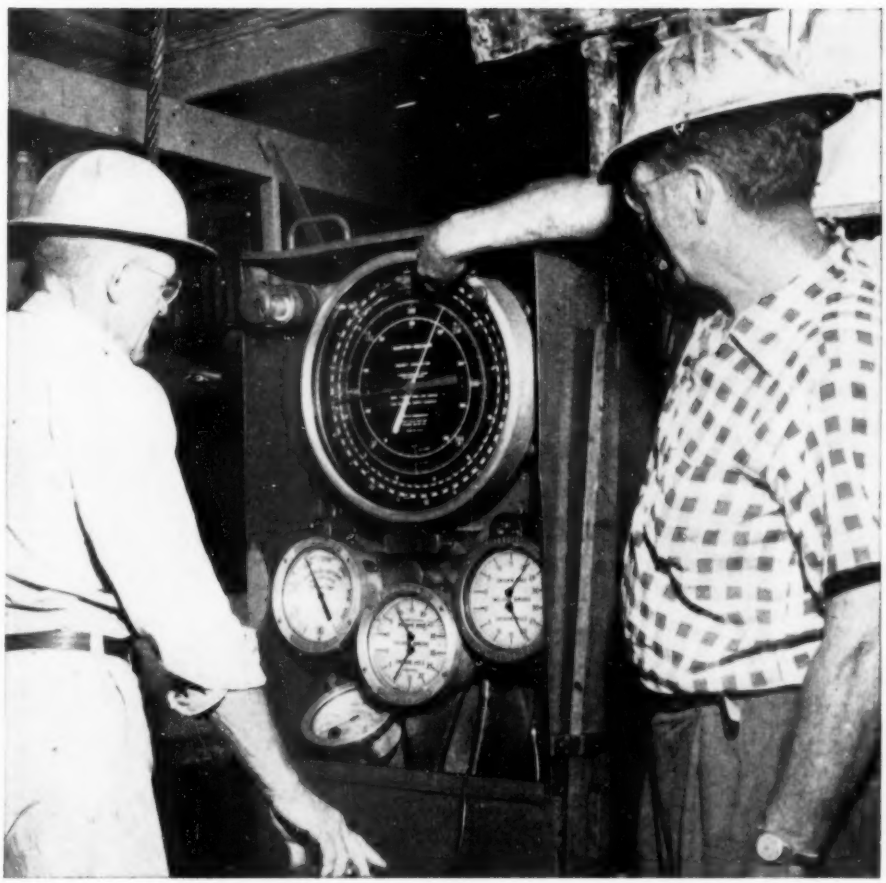
Wire-line care . . . Although diamond bits give more time on bottom and thus fewer round trips, considerable loads are being imposed on the 1¼-in. drilling line. From 15,000 ft. on down, the load of the drill pipe on the drilling lines has been tremendous. At 20,500 ft., weight of the string shown on the weight indicator was about 350,000 lb.; weight to pick up from bottom was approximately 370,000 lb.

As a precaution, therefore, a definite program of wire-line care has been followed. Between 15,000 and 16,000 ft., this program required the line be moved from 3 to 5 ft. after every round trip, and that the line be cut 100 ft. after every fourth round trip. Below 16,000 ft. the program requires that 100 ft. of line be cut off after every round trip.

Personnel on deep test . . . Three drilling crews of five men each, plus a relief crew, drilling foremen, drilling superintendents, petroleum engineers and geologists, headquartering out of Ohio's Bakersfield district office, have kept the big rotary operating around the clock.

Men who have played an important part in the drilling of the well, include: John B. Sutherland, assistant to the manager of production; George Sowards, division manager; Robert M.

THE DEEPEST WELL IN THE WORLD



Ohio Oil Company's Paloma KCLA-72-4 *20,960' World Record Well Equipped With Martin-Decker Type "D" Weight Indicator and Ideal Wire Line Anchor Sealtite Mud Pump Pressure Gauge, two Double Vacuum Gauges and Rotary Table Tachometer. *Sept. 25 drilling ahead at approximately 1' per hour.

27 years ago Martin-Decker introduced the first successful Weight Indicator. Since then, in all countries of the world, drilling depth records have been broken 23 times and, in each instance, not a single record has been obtained without the aid of Martin-Decker Drilling Control Instruments.

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Miller, assistant to the Los Angeles division manager; W. T. Kennedy, division production superintendent; B. H. Doan, drilling superintendent; R. L. Durham, E. L. Fletcher and J. C. Weaver, rotary drilling foremen; A. F. Tokash, district production superintendent; R. W. Shoemaker, district geologist; Tom Wilson, geologist who "sat on the well," W. B. Emery II, district petroleum engineer; C. W. Stephens, division petroleum engineer; Don Everitts, Frank Rieber, W. C. Sheldon and other petroleum engineers; and former division geologist Glen Gariepy, who was recently transferred to Shreveport production division as assistant division manager.

An Ohio veteran who supervised the drilling of the well to about 17,000 ft. was the late Ben Hollandsworth, former drilling superintendent.

Drilling crews were as follows:

A crew: V. E. Gillett, driller; J. J. Helton, derrick man; Leroy Finley, A. McKay and W. E. McLaughlin, rotary helpers; W. A. Harris, relief driller.

B crew: W. T. White, driller; C. A. Craig, derrick man; Roy Baxter, Otis Robertson and V. R. Poehner, rotary helpers.

C crew: Frank Sherman, driller; H. L. Patkoski, derrick man; B. L. Calhoun, D. F. Young and Carl Mead, rotary helpers.

D crew: Fred Ryan, driller; N. C. Tuttle, derrick man; N. S. Woodside, D. O. Shrader, and J. B. Thorp, rotary helpers.

S. R. Norton is vacation relief man and H. Tudor is daylight extra man. Ivan G. Seanor is mechanic.

Well cost . . . Operation of the big rotary at Paloma costs Ohio from $1,600 to $2,000 per day. Estimated cost of drilling and testing the well is more than $1,300,000.

Equipment suppliers . . . The principal equipment on the Ohio Oil Co. deep test, and the manufacturer or supplier, is as follows:

Draw works and transmission: Ideal type 125, normally rated for 10,000 to 13,000-ft. drilling.

Spinning cathead and breakout cathead: Foster.

Drilling engines: Four Superior 6G-510 gas engines through a four-section drive group to draw works and tail pump; two Superior engines of same type on mud pumps.

Air compressors: Westinghouse.

Clutches: Dodge, and Fast Couplings: Koppers.

Mud pumps: Two Ideal C-350 and one C-250 power pump, all equipped with Gadco pulsation dampeners.

Derrick: Lee C. Moore 164-ft.

Crown block: Ideal type 648-TU.

Traveling block: Ideal type 548-TC, 88-in.

Swivel: Ideal type N 815.

Hook: Byron Jackson model 4300.

Rotary tongs: Byron Jackson, Type "B."

Rotary: Ideal type SHS 20½-in.

Rotary drive: Oilwell Independent; Torque converter: Twin Disc.

Rotary power: G.M.C. 6-71 twin diesels.

Rotary hose: Chiksan steel, 3 in. by 55 ft.

Weight indicator: Martin-Decker type D, equipped with mud-pressure gage, two double vacuum gages, and rotary-table tachometer.

Drilling line: Jones & Laughlin 1¼-in. improved plow-steel wire rope with independent wire-rope center.

Drill pipe (at 20,522 ft.): 16,000 ft. of Jones & Laughlin 17.35-lb. supervanadium 6⅝-in. o.d., internal-flush; 3,000 ft. J & L Blue Ribbon 5¾-in. o.d., full-hole; remainder (aside from five 30-ft., 6-in. o.d. drill collars), Spang double-seal 5¾-in. internal flush.

Drill stem: Ideal, forged, 4½ in. by 54 ft.

Blowout controls: Cameron head equipped with blind rams, Cameron head with 4½-in. rams, and Hydril all-purpose head; hydraulic operated by Hydril automatic pump accumulator unit.

Deviation surveys, Totco single-shot recorder.

Drilling records, Geolograph rate-of-penetration log.

Drilling mud, Oil Base, Inc., Black Magic.

Diamond bits and core heads, Christensen and Williams.

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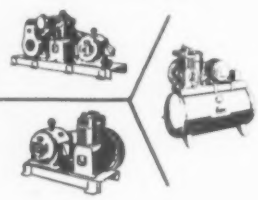

Canadian Gas Reserve

A major portion of the proved natural-gas reserves of western Canada lie in Alberta, with lesser quantities in British Columbia and Saskatchewan. Reserves in these provinces are estimated to be about 9 trillion cubic feet, scattered over a land area about 300 miles long, measuring from north to south, and about 200 to 400 miles wide, from east to west.

Saves Dollars on Moves

MAYHEW'S NEW MODEL 3000 PORTABLE RIG

In moving your rigs from one location to another the man hours used are costly. With the new Mayhew 3000 that time can be reduced to a minimum.

For example, during July of this year a West Texas contractor in Callahan County, using a Mayhew 3000, moved from Warren No. 1 to Warren No. 2. From the time he started to tear down until he was rigged up and drilling for surface hole at the new location only 32 man hours had been consumed.

If you haven't received complete information on this Mayhew 3000 Portable Rig, why not write, wire, or phone us today.

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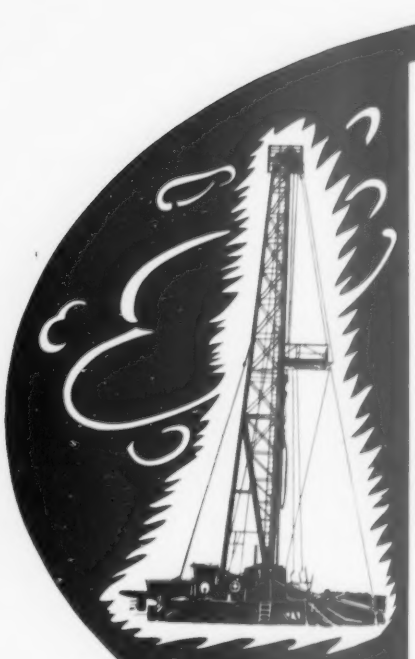

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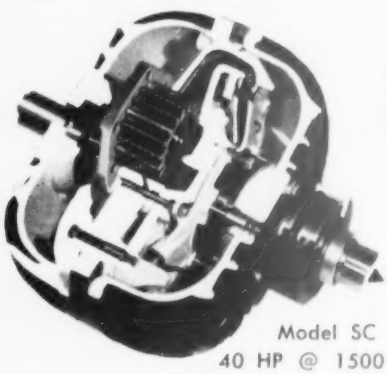
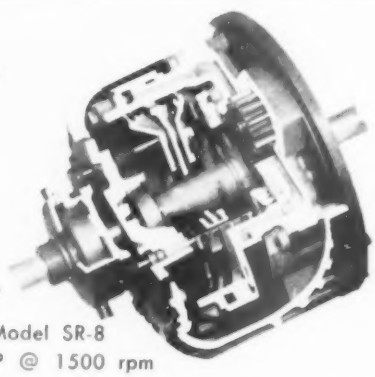


Model SC
40 HP @ 1500 rpm



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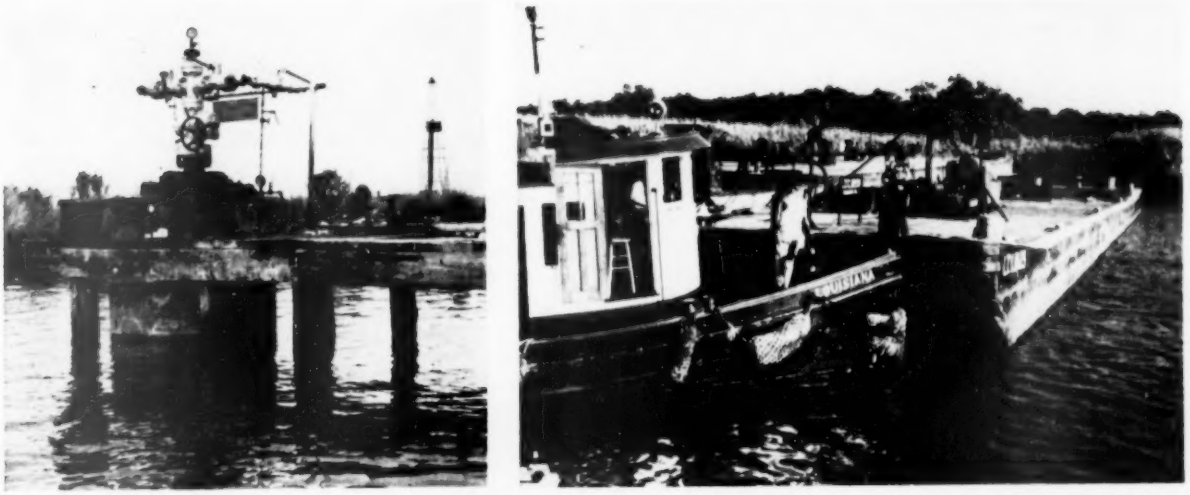

RECORD FOR WORLD'S DEEPEST commercial production was formerly held by Shell Oil Co. 1 Gonsoulin-Minville (foreground) at Weeks Island field, in Iberia Parish, coastal Louisiana. However, this was broken in March by completion of Shell 1 Weeks-Gall Unit (background), which is producing from the Miocene from 17,038-17,122 ft. Total depth is 17,183 ft. Major portion of crude produced at Shell's Weeks Island field is barged to the company's refineries at Norco, La., and Houston.

Deep Drilling at Weeks Island Field

Here are case histories of 11 Shell Oil wells drilled below 15,000 ft. Field is a shallow piercement-type salt dome about 2 miles in diameter

by William P. Sterne
Gulf Coast District Editor

THE new drilling-depth record for Weeks Island field in Iberia Parish, coastal Louisiana, set by Shell Oil Co. with its 2 Gonsoulin - Minville State Unit, has focused attention anew on this important area. Eleven case histories of Shell drilling operations have been assembled here to show in summary form what is involved in Weeks Island deep drilling.

Shell's deep test on the 2 Gonsoulin passed, on August 1, the previous depth record for the area of 17,403 ft. set by Humble Oil & Refining Co.'s 1 Hortense Gonsoulin which was completed in an upper section of the lower Miocene. Shell has been able to cut rig time considerably on its deep developmental wells in Weeks Island field. The 2 Gonsoulin, for example, had passed the 17,300-ft. depth in only 90 days. *(For difficulties encountered in earlier drilling at Weeks Island see The Oil and Gas Journal, September 2, 1948, page 58).*

To date Shell has finaled about a dozen tests below 15,000 ft. in the salt-dome area of Weeks Island. Included in this number is the world's deepest commercial oil well, the 1 Weeks Gall Unit, which is producing from the Miocene from 17,038-17,122 ft., and which has a total depth of 17,183 ft. This was completed in March 1953 as a gas-condensate well.

Located about 15 miles south of New Iberia, La., Weeks Island field is in the coastal tidal marshes. It is a shallow, piercement-type salt dome about 2 miles in diameter. Production, in steeply dipping flanking sands, extends around the north, northwest, west, south, and southeast sides of the dome. The 1 Weeks Gall Unit is on the north flank of the dome where the most prolific and consistent production has been developed.

Other companies active . . . Humble and Gulf Refining Co. are also active in the field, and steady development work has been carried on since oil was discovered in 1945. Present daily average production exceeds 33,000 bbl., and accumulative production has been approximately 30,000,000 bbl. During 1952, a total of 10,700,000 bbl. was produced.

Drilling in the field has been carried on with barge-mounted rigs which are operated either in natural or artificial waterways. The west side of the salt dome is in the waters of Weeks Bay.

Quicker Drilling

Penetration rates at Weeks Island sometimes have been only 12 to 15 ft. per day. In a number of wells, several thousand feet of salt overhang had to be penetrated before reaching the producing sands. Thus average time to drill and complete wells in the gouge zone with depth of about 12,400 ft., originally was as much as 200 days.

However, thanks to the development of specially adapted practices, coupled with improved drilling muds, most of these problems have now been overcome. In fact, later wells in this category have been drilled in an average time of only 148 days, with costs reduced to about $350,000 per well on the average.

Deeper wells, extended away from the salt mass and gouge area, have been drilled and completed with minimum trouble by adjustment of drilling practices and mud treatment for their particular needs.

Medium-depth-range wells, from 13,000 to 14,000 ft., are now being drilled in an average time of only 65 days, at a cost of approximately $200,000 per well. The deeper wells to 15,000 ft. and beyond usually take from 200 to

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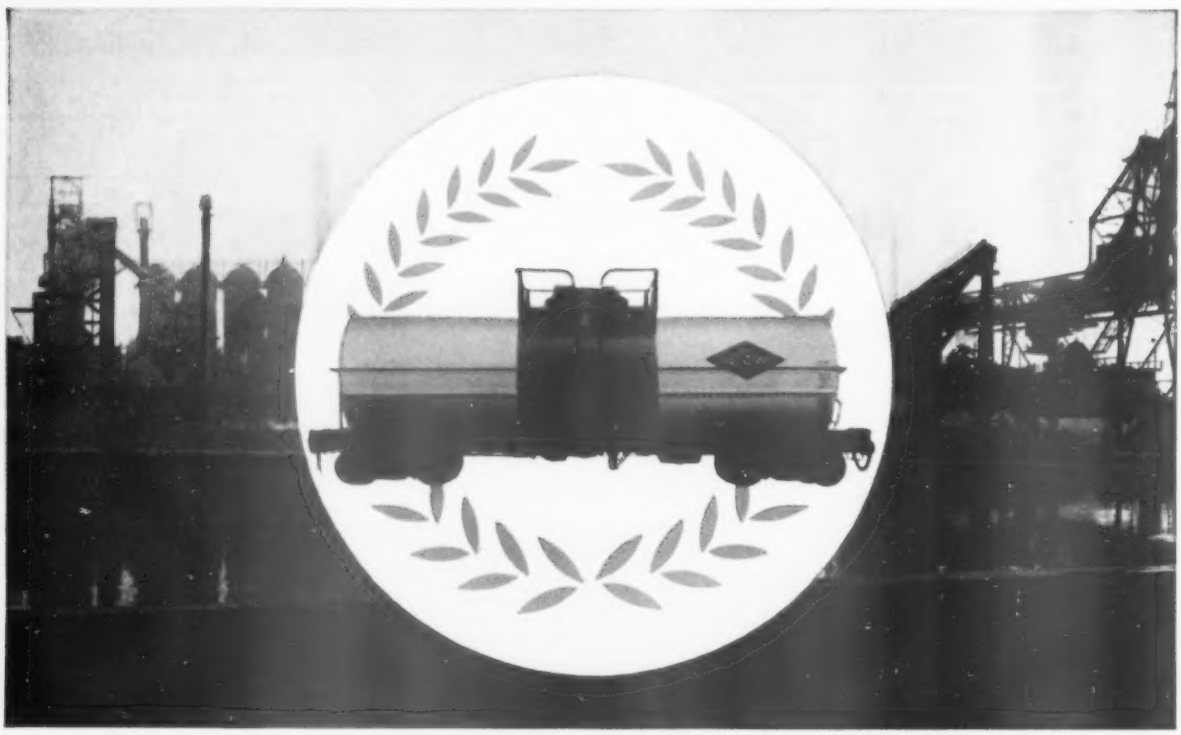

Once your processing methods and materials are set, you have to be certain that the standards are maintained to assure the same efficient results every time.

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SHELL HAS ONE OF THE LARGEST concentrations of crude-oil storage tanks in Louisiana at Weeks Island field. In addition to 33 tanks with a capacity of 1,000 bbl. each, there are two main storage tanks of 50,000 and 100,000-bbl. capacity, plus a number of other tanks. An 8-in. pipe line is presently being installed to bring crude into the battery.

220 days, and cost up to half a million dollars each.

Shell has been successful, however, in cutting rig time appreciably. For instance, its 2 Gonsoulin - Minville State Unit, which up to August 1 was coring below 17,300 ft., was spudded in on April 25. By comparison, the world's deepest producer, Shell 1 Weeks Gall Unit, required 141 days to reach total depth of 17,183 ft.

Following are case histories of 11 Shell wells drilled below 15,000 ft., which have been completed at Weeks Island from 1950 to date (excluding the current 2 Gonsoulin-Minville which is coring ahead):

World's Deepest Producer

Shell 1 Weeks Gall Unit . . . This gas-condensate well, which is producing from the Miocene from 17,038-17,122 ft., is bottomed at 17,283 ft. Completed March 11, 1953, the well required a total of 141 days to drill. It was spudded on October 9, 1952. Initial potential was 138 bbl. of oil per day, with 3,950,000 cu. ft. of gas, on a 24/64-in. choke. Tubing pressure was 1,400 psi., and producing gas-oil ratio was 28,630. Oil is 39.2° gravity.

Rig . . . The well was drilled from a barge-mounted rig, whose base was 152 by 54 ft., and 14 ft. high. Derrick was a 186-ft. unit with 1,000,000-lb. capacity. Draw works had a horsepower rating of 2,000, and drilling engines, 16 by 16, were rated at 2,300 hp. each. Two mud pumps, both 19 by 7¾ by 22, were used to handle this phase of the job.

Casing program . . . A 123-ft. joint of 20-in. conductor pipe was run in a 27-in. hole, and from 123 to 2,971 ft., a string of 13⅜-in. casing, in 73 segments, was run in a 17½-in. hole. From that depth to 13,000 ft., 330 segments of 9⅝-in. casing were run in a 12¼-in. hole. Seven-inch liner, containing 100 segments, was run from 13,000 to 16,932 ft.

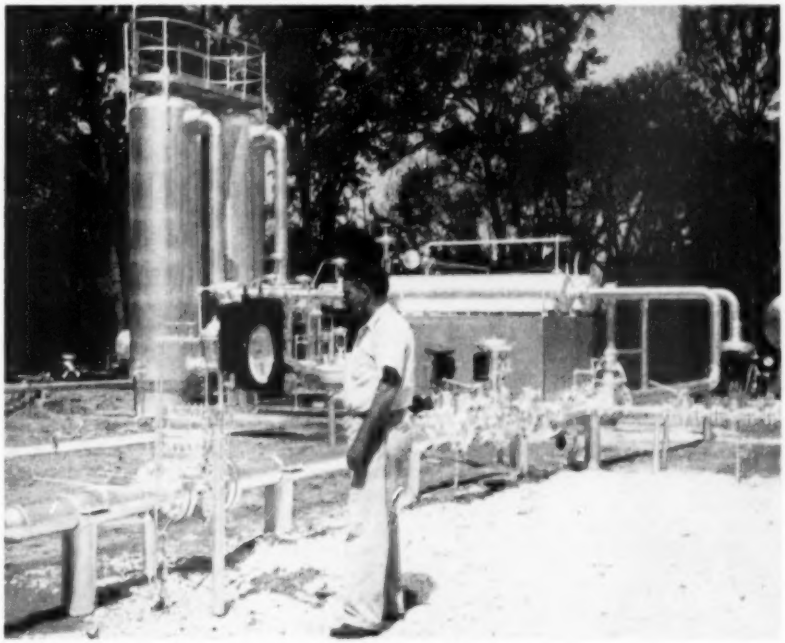
Bit summary . . . Thirty-two 12¼-in. bits were required to drill to 13,189 ft., in 520 hours' drilling time, or an average of 25.3 ft. per hour, and 411 ft. per bit. Average hours on bottom per bit was 16. In addition, sixty-one 8⅜-in. bits were used to drill 3,490 ft. of hole, for an average of 57 ft. per bit; twelve 6-in. bits made 240 ft. of hole, averaging 20 ft. per bit; and four 7⅞-in. bits made 264 ft. of hole, averaging 66 ft. of hole per bit.

Coring . . . Total number of diamond-core bits were used as follows: From 15,805-37 ft., 32; 15,875-15,905 ft., 30; 16,487-16,610 ft., 123; 16,710-59 ft., 49; and 17,122-42 ft., 30.

Mud program . . . A total of 76,900 lb. of bentonite was used, with the major product, barite, totaling 1,039,800 lb. Other poundages for various types of mud used on this test are as follows: quebracho, 19,150; Driscose, 1,150; lime, 59,600; starch, 12,200; other (Carbonox), 23,375; caustic soda, 29,800; diesel oil, 334 bbl. Viscosity of mud and water loss was 13.1 lb. per gallon, 55 seconds, 3.66 cc. at total depth.

Operators replaced lime-treated oil-emulsion mud with red mud at total depth because the lime-treated mud in lower portion of the hole became semisolid while running electric log

Cementing . . . A total of 150 sacks was used to set first conductor pipe, with plug placed at 110 ft.; 275 sacks were required to set second string to 2,930 ft.; 425 sacks



LOW-PRESSURE GAS is conditioned for sale in these dehydrators at Weeks Island by Shell Oil Co., after it is compressed to about 900 psi. Units operate automatically. Work now under way at Weeks Island will double gas-compression facilities.

were used to set protective string to 12,963 ft.; and 550 sacks used to set liner.

Test results . . . On production test, this well flowed 320 bbl. of 39°-gravity condensate, plus 8,281,000 cu. ft. through a 17.5/64-in. choke, with tubing pressure 5,275 psig.

Shell 1 Williams

Although this test was plugged and abandoned in September 1952, drilling data are interesting. A total of 195 days over-all was required in drilling this well to total depth of 15,970 ft.

Rig . . . A 136-ft. derrick with 800,000-lb. capacity was used to drill the test from a barge whose base was 138 ft. by 44 ft. by 10 ft., with an 8-ft. slot. The steam rig was powered by four 150-hp. 350-psi. boilers, and engines, 14 by 14, were rated at 1,400 hp. at 350 psi. manifold pressure and 350 r.p.m. Draw works had a horsepower rating of 1,400. Two mud pumps, one 18 by 7 by 20 ft. and the other 19 by 3¾ by 22 ft., were steam powered.

Bits . . . Thirty-six 12¼-in. bits were used to drill 12,313 ft., in 762 drilling hours, for an average of 16 ft. per hour, or 342 ft. per bit. Time on bottom averaged 21 hours per bit. Others used included: fourteen 8⅜-in. bits, making 2,774 ft. in 207 hours, for an average of 9 ft. per hour, or 198 ft. per bit, with average hours on bottom, 22 per bit; twelve 9⅞-in. bits, making 1,002 ft. in 377 hours, for an average of 3 ft. per hour, or 8 ft. per bit, and average time on bottom per bit 31 hours; fifty-eight 6½-in. bits making 335 ft. in 2,234 drilling hours, or an average of 0.15 ft. per hour, and 5 hours per bit, with hours on bottom averaging 38 per bit.

Reaming . . . A total of 63½ hours was spent reaming at different intervals in this test, from 14,087 to 15,458 ft.

An insufficient sample was reamed for the first eight cores taken, and the next five cores showed silt and sand. The following six cores showed sand and shale.

Drilling summary . . . A total of 158 days was spent on bottom, in normal trips, and rig service. Coring, including trips, took 2 days; mechanical down time, 5 days; fishing jobs, 13 days; mixing mud, lost circulation, and hole conditioning, 9 days; surveys, 2 days; casing, reaming, and running, 3 days; waiting on cement, 2 days; and completion plugback, 1 day.

Mud . . . An alkaline-tannate mud was used from surface to plugged-and-abandoned depth of 14,985 ft. Mud was composed of Baroid, caustic quebracho, phosphate, tannathin, Mylogel, Magogel, Magcobar, and Magcofos. Average weight was 9.5 to 13 lb., and average viscosity, 45 to 60 seconds.

Cementing . . . Two hundred sacks of cement were used to set 120 ft. of surface casing; 300 sacks requiring an 8 per cent gel were used to set 3,000 ft. of casing, with plug set at 2,957 ft.; and 425 sacks, with 4 per cent gel plus 0.5 per cent HR-4 were required for setting bottom string to 15,086 ft., with plug placed at 15,049 ft.

Rig down time was the only mechanical difficulty experienced during this test. A total of 5 days was required to repair the rig and a total of 9 days was spent conditioning mud and circulating.

1 Shell Continental E. T. Weeks

This successful oil producer was completed in September 1952 at a total depth of 15,342 ft., with production from from the "T" sand, from 15,138-15,239 ft.

Rig . . . A 136-ft. derrick with 900,000-lb. capacity was used to drill the well. Barge on which it was mounted measured 140 by 52 by 11 ft., with an 8 by 69-ft. slot. Draw works had a rating of 1,050 hp., and three diesel engines each had a horsepower rating of 425 each at 900 r.p.m. Two mud pumps, both 8 by 18 by 18, and each rated at 600 hp. at 55 r.p.m., were used in connection with the drilling.

Bits used . . . Thirty 12¼-in. bits drilled 12,064 ft. of hole in 791 hours, or an average of 15 ft. per hour, and 402 ft. per bit. Average time on bottom per bit was 26 hours. Fifty-two 8⅜-in. bits drilled to 13,080 ft. in 1,380 hours, or an average of 9 ft. per hour and 251 ft. of hole per bit. Average time on bottom, per bit, was 26 hours. Two 5⅜-in. and one 5½-in. bit were used to drill up packer which set prematurely.

A total of only 3 hours was spent reaming during the entire time the hole was being drilled. No coring was done.

Drilling summary . . . A total of 104 days was spent on bottom, in normal trips, and on rig service; 2 days on mechanical down time; 2 days in mixing mud, lost circulation, and hole conditioning; 3 days for surveys; 1 day was spent in running casing and reaming; 6 days waiting on cement; and 8 days in completion.

Mud . . . An alkaline-tannate mud was used to a depth of 12,000 ft. This consisted of Baroid, quebracho, clay, Magcogel, and Aquagel. Average weight of the mud was 10 lb. and average viscosity 40 seconds.

Operator converted to a lime-treated mud at a depth of 12,064 ft., and used this type to total depth. It consisted of starch, Carbonox, caustic, Aquagel, clay, lime, and Baroid. Weight averaged from 10½ to 11½ lb. and average viscosity was 45 to 55 seconds.

Tubing . . . A total of 15,119 ft. of 2⅜-in. tubing was used in this well, with a production packer. Weight of tubing was 4.7 lb. per foot.

Completion . . . Perforations were made by 160 shots of 26.8-g. jets, between 15,140-80 ft. The well was completed on a 16/64-in. choke with casing pressure of 400 psi., and tubing pressure 1,575 psi. Gravity of the oil is 30.2° A.P.I., and producing gas-oil ratio was 1,290.

1 Shell J. Smith "A" State Unit "F"

Little difficulty was encountered in drilling and completing this producer, which is making free oil from the "T" sand from 15,211-15,316 ft., and which is bottomed at 15,345 ft. However, circulation of mud was lost at depths of 1,054 ft. and 2,992 ft. before surface casing was set. A total of 9 days was required for down time to replace the jack shaft on the draw works, and other minor rig repairs.

Equipment . . . Shell used a 186-ft. derrick with 1,000,000-lb. capacity to drill this oiler at Weeks Island. Draw works had a capacity of 1,620 hp. input, and 16 by 16 engines had rated capacity of 1,620 hp. at 350 psi. manifold pressure and 350 r.p.m. This setup was contained on a 152 by 54 by 14-ft., drilling barge with an 8-ft. slot, and the rig was steam powered by five 150-hp., 350-psi. boilers. Two steam-powered mud pumps, each 19 by 7¾ by 22, were used.

Drilling summary . . . This test required 65 days of work on bottom, normal trips, and rig service; 9 days for mechanical down time; 2 days in mixing mud and hole conditioning; 1 day on surveys; 3 days in reaming and running casing; 7 days in waiting on cement; and 8 days in completing.

Mud program . . . An alkaline-tannate mud from base of conductor pipe to 11,888 ft. was used on this well. This consisted of caustic, Baroid, Carbonox, phosphate, Aquagel, and quebracho. Average weight was 10 lb. and viscosity was 40 seconds.

Lime-starch mud was used from 11,888 ft. to 14,724 ft. This mud consisted of lime, starch, caustic, Carbonox, Baroid, and lignox. Average weight and viscosity were 11 lb. and 43 seconds, respectively.

An oil-emulsion mud was used from 14,724 ft. to completion of the hole. This consisted of diesel oil, Baroid, Aquagel, caustic, lime, clay, and Carbonox. Average weight and viscosity were 11.2 lb. and 52 seconds.

Completions . . . The hole was shot with 136 17-g. jets between 15,210-15,246 ft. Well was completed on a 13/64-in. choke, with tubing pressure of 1,925 psi., and producing gas-oil ratio of 1,012. Gravity of oil is 13.1°.

1 Shell Weeks-Gall Unit 3

This oil producer was completed in February 1952, making oil from the "T" sand through perforations from 15,187-15,295 ft. Total depth is 15,325 ft. No unusual difficulties were encountered, and the drilling program was average at that time for Shell's wells in the Weeks Island area.

Equipment . . . Drilled with a 136-ft. mast with 800,000-lb. capacity, the barge-mounted equipment was powered by steam. Barge measured 138 by 44 by 10 ft., with an 8-ft. slot. Draw works had a 1,400-hp. input rating, and 14 by 14 engines had a rating of 1,400 hp. at 350 psi. manifold pressure and 350 r.p.m. Two mud pumps, one 18 by 8 by 20, and the other 19 by 7¾ by 22, were steam powered.

Drilling summary . . . Time required for operations was: On bottom, normal trips, and rig service, 80 days; mechanical down time, 3 days; mixing mud and hole conditioning, 2 days; surveys, 1 day; reaming and running casing, 2 days; waiting on cement, 4 days; completion 8 days.

Mud . . . Alkaline-tannate mud was used to a depth of 12,085 ft., consisting of high-yield clay, caustic, tannathin, phosphate, Magcogel, Magcobar, Carbonox, and Baroid. Average weight of the mud was 10 lb., and viscosity was 45 seconds. A lime-starch mud was used from 12,085 ft. to completion depth, consisting of caustic soda, lime, tannathin, Mylogel, Baroid, and high-yield clay. Average weight was 11.3 lb. and viscosity averaged 61 seconds.

Completion . . . A total of 13,456 ft. of tubing was used, with a packer. Ten shots of 21-g. jets were used to perforate between 13,570-13,573 ft., and 160 shots of 10-g. jets from 15,190 to 15,230 ft. The well was completed on a 12/64-in. choke with tubing pressure of 2,700 lb., and gas-oil ratio 1,054. Gravity of oil is 31.9° A.P.I.

Shell 1 J. A. Smith B.

Another producer from the "T" sand, this test, completed in December 1951, is making oil from 15,200-15,301 ft., with total depth of 15,340 ft. It was drilled from a barge whose base was 152 by 54 by 14 ft., with an 8-ft. slot. Rig was steam powered by five 150-hp., 350-psi. boilers. Draw works was rated at 1,620-hp. input, and the 16 by 16 steam engines were rated at 1,620 hp. at 350 psi. manifold pressure and 350 r.p.m. Two steam-powered mud pumps were used, each 19 by 7¾ by 22. Drilling mast was 186 ft. high with 1,000,000-lb. capacity.

Drilling summary . . . This well required 86 days of rig service, 4 days of mechanical down time, 1 day to mix mud and condition hole, 2 days for surveys, 2 days for running casing, 8 days for waiting on cement, and 6 days for completion.

Mud . . . Alkaline-tannate mud was used up to 10,178 ft., which consisted of caustic, Carbonox, Aquagel, Baroid, and clay. Average weight was 9½ lb., with average viscosity 40 seconds. Lime-base mud was used from 10,178 ft. to total depth, consisting of caustic, Carbonox, lime, Impermex, Aquagel, and Baroco. Average weight for this type mud was 10½ lb., and average viscosity 47 seconds.

Completion . . . The well was plugged back to 15,239 ft. A total of 14,577 ft. of 2⅜-in. tubing, weighing 4.7 lb. per foot, was used.

The well was perforated with 128 shots of 28-g. jets between 15,204-38 ft. and was completed on a 13/64-in. choke, with a tubing pressure of 2,500 psi., and producing gas-oil ratio of 920. Oil is 30° gravity.

Shell 1 Weeks Gall

Shell completed this well in October 1951, as an oil producer, from "T" sand from 15,208-15,305 ft. Total footage drilled was 15,343 ft.

Equipment . . . This test was drilled from a drilling barge whose base was 138 by 44 by 10 ft., with an 8-ft. slot. The steam rig was powered by four 150-hp., 350-psi. boilers. Draw works utilized 14 by 14 engines, and had a horsepower rating of 1,400 input. A 136-ft. mast with 800,000-lb. capacity was used.

Drilling . . . Total rig service, including time on bottom and normal trips, amounted to 106 days. Coring, including trips, took 16 days; mechanical down time, 5 days; mixing mud and hole conditioning, 2 days; surveys, 4 days; reaming and running casing, 4 days; waiting on cement, 4 days; and completing, 6 days.

Completion . . . The well was plugged back to 15,296 ft., and 2⅜-in. casing was run to 15,189 ft. Perforations with 136 shots were made from 15,210-46 ft.

Completion was made on a 12/64-in. choke, with tubing pressure of 2,225 psi. Producing gas-oil ratio was 1,088, and gravity of the oil 30.7°.

Shell 1 Weeks Gall State Unit 1

Originally completed in the "R" sand on September 30, 1949, this test was recompleted on October 23, 1951, in the "S" sand, from 14,285-14,428 ft. It also produces from the "R" sand from 14,148-14,200 ft. Total footage drilled is 15,913 ft.

A total of 154 ft. was cored on this well when it was originally completed in September 1949. Coring was carried on in the "R" and "S" sands, in order to obtain additional data for evaluation of these reservoirs.

Equipment . . . The test was drilled from a barge whose base was 138 by 44 by 10 ft., with an 8-ft. slot. Steam powered by four 150-hp., 350-psi. boilers, the draw works had a rated capacity of 1,400 hp. input. Two mud pumps, one 18 by 8 by 20, and the other 19 by 7¾ by 22, steam powered, were used. A 136-ft., 800,000-lb.-capacity derrick handled the pipe.

Drilling data . . . Rig service, including time on bottom and normal trips, required 139 days; coring, including trips, 8 days; mechanical down time, 1 day; fishing jobs, 5 days; mixing mud, lost circulation, and hole conditioning, 1 day; surveys, 2 days; reaming and running casing, 3 days; waiting on cement, 7 days; and completing, 9 days.

Completion . . . The well was plugged back to 14,386 ft. for the "S" sand, and 14,366 ft. for the "R" sand.

A total of 14,282 ft. of 2⅜-in. tubing was run, and packer set at 14,282 ft. for the "S" sand, and 14,182 ft. of 2⅜-in. tubing was run with packer set at 14,120 ft. for the "R" sand.

Fifty-six shots between 14,302-16 ft. were required to gain production from the "S" sand, and 60 shots between 14,150-65 ft. for the "R" sand.

The well was completed in the "S" sand on a 12/64-in. choke, with producing gas-oil ratio 1,230. The "R" sand was completed on a 11/64-in. choke with a producing gas-oil ratio of 1,134. Gravity of the "S" sand oil is 32.2° and that of the "R" sand, 34°.

1 Gonsoulin-Minville State Unit 1

This well's total depth of 16,648 ft. was drilled in 336 days, and it was completed for an initial potential of 480 bbl. of oil and 552,000 cu. ft. of gas daily on a 10/64-in. choke. Tubing pressure was 2,750 psi., and producing gas-oil ratio, 1,150. Gravity of the oil is 32° A.P.I. Production is from the Miocene, from 15,296-15,336 ft.

One of the most expensive wells drilled by Shell at Weeks Island, 342 days over-all were required to drill and complete, including operations suspended 1 day and waiting on cement 5 days. This test was diamond cored from 15,288 to 15,409 ft.; 15,460 to 15,516 ft.; 15,637-87 ft.; 15,731-72 ft.; 16,302 to 16,476 ft.; and 16,566-77 ft.

Fish was lost in the hole at total depth of 15,635 ft. Top of fish was located at 11,368 ft., and fishing operations began on December 24, 1950. All of fish was recovered

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by April 25, 1951, and drilling then resumed.

Mud . . . Following is amount of mud used in this test: Bentonite, 121,500 lb.; Barite, 1,027,900 lb.; quebracho, 4,475 lb.; lime-147,800 lb.; starch, 36,700 lb.; other (Carbonox), 54,100 lb.; diesel oil, 601 bbl. Viscosity of mud and water loss was 13 lb. per gallon, 60 seconds, 2.5 cc. Operator had to add a large quantity of water and Carbonox at 16,116 ft. because lime-treated oil-emulsion mud became semisolid in lower portion of hole during a trip.

Shell 1 J. A. Smith A

This test was another "dual" completion, having first been completed in November 1948 in the "R" sand from 14,239-86 ft., and later being finaled in the "S" sand in June 1951, from 14,393-14,450 ft. Total footage drilled was 15,094.

Rig . . . Drilled from a barge whose base was 152 by 54 by 14 ft., with an 8-ft. slot, this well was handled with a 186-ft. derrick with 1,000,000-lb. capacity. Steam-powered draw works had a capacity of 1,620 hp. input, and engines were 16 by 16. Two mud pumps, each 19 by 7¾ by 22 in., steam powered, were used.

A total of 17 hours was spent reaming below depth of 14,349 ft., and 7 days were required to core and evaluate the "R" and "S" sands. A rundown on drilling time includes: 63 days rig service, 7 days coring, 6 days mechanical down time, 10 days fishing, 15 days conditioning hole and mixing mud, 2 days for surveys, 2 days for running casing and reaming, 6 days waiting on cement, and 15 days in completing.

Mud . . . An alkaline-tannate (red) mud flush was used to 11,153 ft., and was composed of quebracho, caustic, bentonite, Myogel, and Magcobar. Average mud weight was 10.3 lb. and viscosity 23 seconds. A lime-starch mud was used from 11,153 ft. to completion depth, and was composed of Magcobar, quebracho, caustic, Jel-Oil "E," bentonite, clay and tannathin.

Completion . . . Plugbacks were made in the "R" sand at 14,870 ft., and the "S" sand at 14,420 ft. A total of 14,217 ft. of 2⅜-in. tubing was used with packer to produce the "R" sand, and 14,293 ft. of 2⅜-in. tubing with packer to produce the "S" sand.

Perforations were made in the "R" sand from 14,243-14,255 ft. with 48 shots of 15/32-in. size; in the "S" sand from 14,393-14,416 ft. with 92 shots, ½-in. size.

Completion from the "R" sand was made on a 10/64-in. choke with tubing pressure 2,575 psi. and producing gas-oil ratio 1,095. Gravity of the oil is 34°. Completion from the "S" sand was made on a 10.5/64-in. choke with tubing pressure 2,836 psi. Producing gas-oil ratio was 1,021 and gravity of the oil, 32°.

Shell Weeks Gall State Unit 2-2

This test was officially completed on September 27, 1950, in the Miocene, from 15,110-15,156 ft., as an oil well. Total footage was 15,361 ft., the well having been plugged back and directionally drilled, which accounted for 692 ft. of excess footage.

Two fishing jobs were encountered. The first fish was lost in hole at total depth of 14,718 ft. Top of fish was located at 14,630 ft., and drilling was resumed after 11 days of fishing. The second fish was lost in hole at total depth of 15,295 ft., with top of the fish located at 15,274 ft. Fishing job was unsuccessful, and universal whipstock was set at 14,603 ft. and drilling was resumed directionally.

A total of 210 days was required in drilling total footage of 16,199 ft.

Rig . . . Base of the drilling barge was 152 by 54 by 14, and the 186-ft. mast had a capacity of 1,000,000 lb. The draw works had a rating of 2,000 hp. input, and 16 by 16 engines were rated at 2,300 hp. Two 19 by 7¾ by 22-in. mud pumps were used.

Total depth was 15,361 ft., with plugged-back total depth of 15,200 ft. Producing interval comes from perforations made at 15,138-15,148 ft. Initial potential was 325 bbl. daily on a 12 64-in. choke. Gravity of the oil is 33° and producing gas-oil ratio is 4,356 and tubing pressure 2,950 psi.

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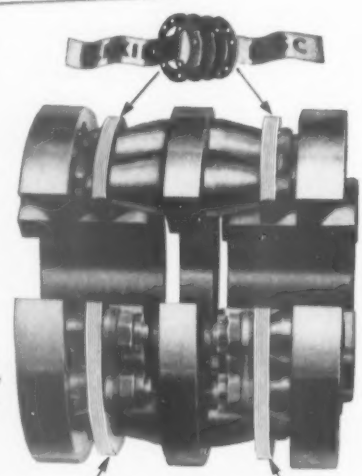

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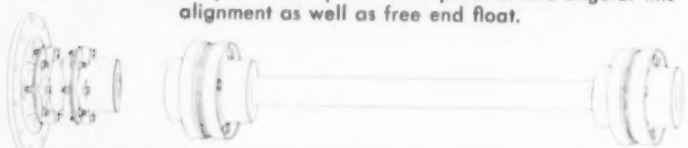

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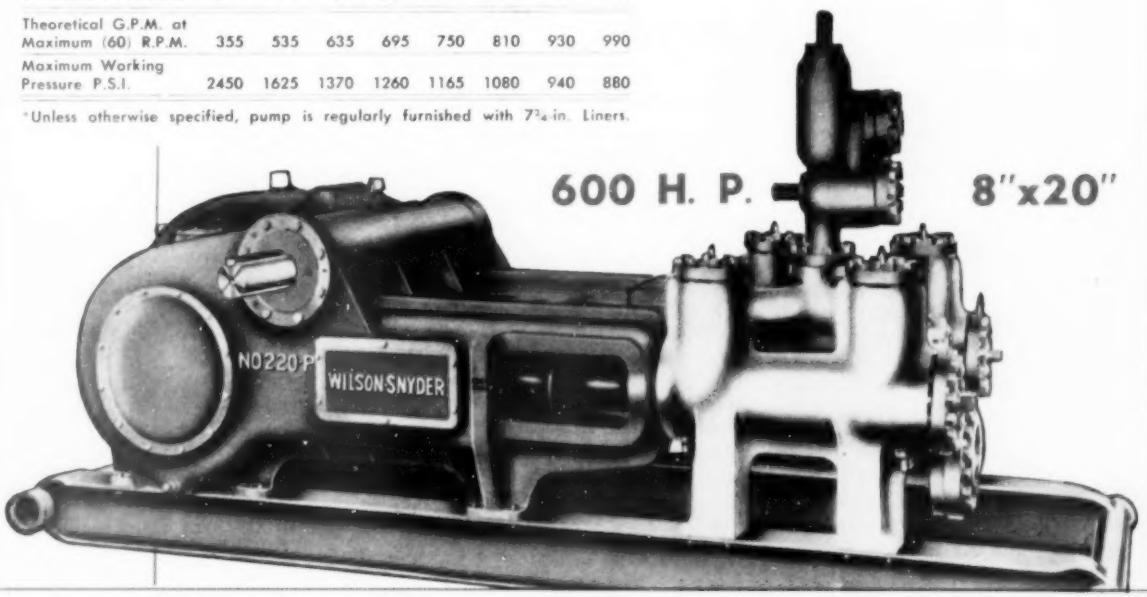

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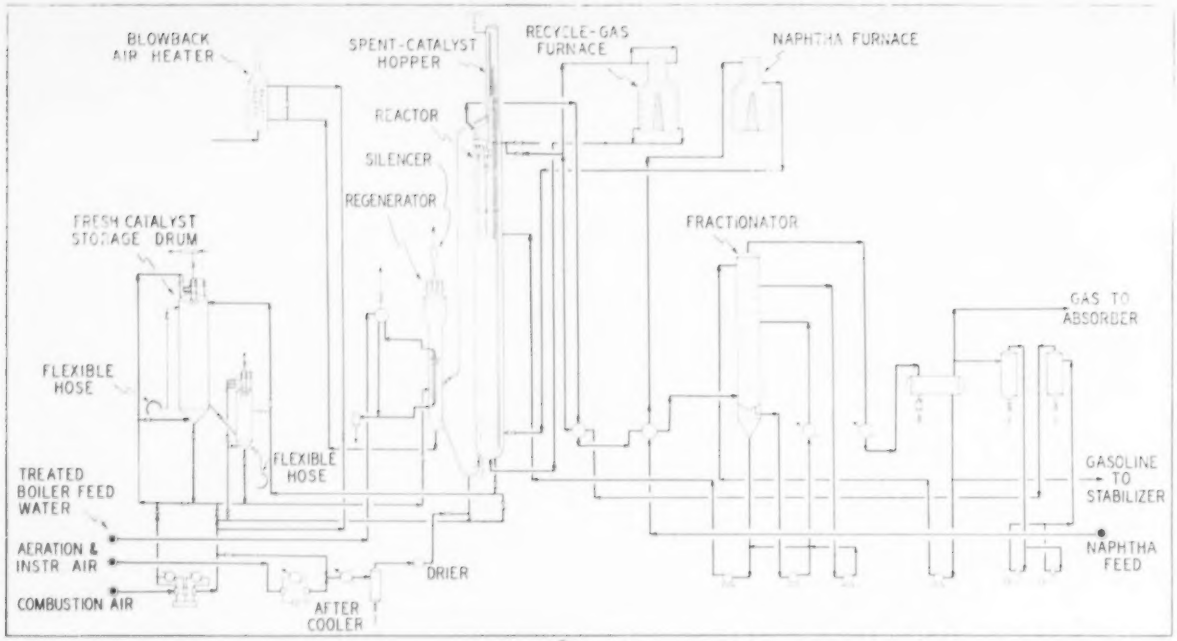

Fig. 1—Simplified flow sheet of the catalytic fluid hydroforming process at Pan-Am Southern's Destrehan, La., refinery.

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by R. A. Harang

FLUID hydroforming is the application of the fluid catalyst techniques which have been in the past 12 years widely applied to the catalytic cracking of gas oil or reduced crude and the reforming of naphtha for the production of high-octane motor and aviation gasoline.

The extension of fluid-catalyst principles to the more complex hydroforming process introduces design problems associated with the more severe operating conditions. These are considered in this article.

The Process

In the hydroforming process, straight-run naphtha of low octane number is converted into high-octane gasoline by contacting the naphtha with a catalyst at suitable pressure and temperature conditions and in the presence of hydrogen in relatively high concentration. The hydrogen is produced in the process and the concentration is maintained by recycling to the reactor a gas stream rich in hydrogen. The design process conditions are shown in Table 1.

Author is project engineer with M. W. Kellogg Co., New York. Paper presented at the petroleum mechanical engineering conference of the American Society of Mechanical Engineers, Houston, September 28-30, 1953.

A simplified flow sheet for the Destrehan fluid catalytic hydroforming unit is shown in Fig. 1. The vaporized naphtha charge is injected into a bed of fluidized powdered catalyst in the bottom of the vessel, while recycle gas enters the bottom and passes through an internal distributor.

TABLE 1

Reactor:	
Operating pressure, psig.	250
Operating temperature, °F.	920
Naphtha feed temperature, °F.	930
Recycle gas temperature, °F.	1,300
Regenerated catalyst temperature, °F.	1,100
Spent-catalyst hopper:	
Operating pressure, psig.	250
Operating temperature, °F.	910
Regenerator:	
Operating pressure, psig.	260
Operating temperature, °F.	1,100
Bed cooler pressure, psig.	250
Bed cooler temperature, °F.	406
Combustion air temperature, °F.	290
Spent catalyst temperature, °F.	910

The upward flow of vapor through the catalyst bed keeps the bed in a fluidized state. Near the top of the bed, a stream of catalyst-bearing slurry oil from the bottom of the fractionator may be returned to the reactor. This oil is quickly vaporized at the temperatures existing within the vessel.

The vapor flowing upward from the surface of the bed carries a certain amount of catalyst with it. Most of the entrained catalyst settles out in the disengaging space above the bed. The vapor then enters cyclone separators where most of the remaining catalyst is recovered before the vapor passes to the fractionator.

Catalyst regeneration . . . Spent catalyst is withdrawn from the lower part of

the reactor bed into an internal riser pipe and lifted to the stripper section above the reactor in a stream of recycle gas. The rate of catalyst withdrawal is controlled by the opening of a plug valve at the inlet end of the riser. The carrier gas enters the riser line through the hollow stem of the valve.

Spent catalyst is separated from the carrier gas in the stripper hopper which is vented to the top of the reactor. Steam is used to strip hydrocarbons from the spent catalyst which otherwise would be carried to the regenerator and burned. The steam and stripped vapor flows up through the hopper bed and passes into the reactor via the vent pipe. The stripped catalyst then flows by gravity through a standpipe which conveys it to the regenerator at a rate which is governed by a slide valve in the line.

Coke is deposited on the catalyst as a product of the hydroforming reaction and is burned off in the regenerator. The combustion air enters the regenerator through an internal distributing grid. A portion of the heat generated by the combustion of coke is utilized to make steam in vertical boiler tubes placed in the regenerator bed.

The flue gas passes through a disengaging space above the bed where some of the entrained catalyst settles out. Additional entrained catalyst is removed from the gas by cyclone separators or filters arranged in the top of the regenerator (from the filter outlets). The flue gas then passes through an automatic valve and manual valves to reduce pressure and thence through a silencer to the atmosphere.

Regenerated catalyst flows by gravity from the lower part of the regenerator bed through a standpipe into the bottom of the reactor. This flow rate is regulated by a valve which automatically controls the level in the regenerator.

The reactor overhead vapor is cooled before entering the fractionator tower by heat exchange with recycle gas and fresh naphtha. The relatively heavy fractions are condensed out by a heavy oil reflux in the lower baffled section of the tower which also scrubs out the entrained catalyst which flows to the bottom slurry-settling section of the tower. Thickened slurry of catalyst in oil is taken from the bottom of the settler and pumped to the reactor to return the catalyst to the system.

The fractionator overhead vapor is partially condensed and the resulting gas and liquid separated in a reflux drum. A portion of the condensate is returned to the tower as top reflux while the net product flows to the stabilizing section under its own pressure. A portion of the uncondensed gas is for use as recycle bleed and carrier gas; the net gas make flows to an absorber in which the heavier ends are removed by contact with fresh naphtha feed.

Mechanical Design

The regenerator is constructed to meet the requirements of the A.S.M.E. Unfired Pressure Vessel Code, with a joint efficiency of 95 per cent corresponding to X-rayed and stress-relieved construction. Fig. 2 is a schematic drawing of the Destrehan regenerator. The lower section is 2 ft. 11 in. i.d. of steel while the upper section is enlarged to 6 ft. of steel to house the filter or cyclone assemblies. It is lined with insulating and refractory concrete in order to reduce the metal temperature.

The vertical-tube waste-heat boiler in the lower section of the regenerator meets the requirements of the A.S.M.E. Power Boiler Code. The tubes were installed in the field after the vessel was erected and the entire steam-generating system was hydrostatically tested after construction.

The materials of construction can be carbon steel throughout with the exception of internal (piping and tubes) parts for which it is economic to use low alloy steel for structural considerations.

The filter assemblies were designed for use of ceramic or metallic filters. With metallic filters, an adapter piece is used to handle two metallic filters in order to provide the same filter area as that available with the ceramic filters. The filters are arranged in 4 banks of 4 filters each, giving a total of 16 filter elements. Each bank of filters has an individual outlet line which passes through the top head of the regenerator and is provided with an automatic blowback valve on time cycle control. The four outlets are joined outside of the vessel into a common flue-gas stack.

Regenerator cooler . . . The regenerator bed temperature is controlled by means of a series of vertical boiler tubes, partially submerged in the bed. The feed water for this cooler is supplied from a steam separator drum by gravity flow and the rate of circulation is based on the thermal siphon effect of the steam generated. The catalyst bed level is adjusted to control the amount of tube surface in contact with the bed depending on the desired regeneration temperature. The steam generated in this waste-heat boiler is sent to the unit high-pressure steam system.

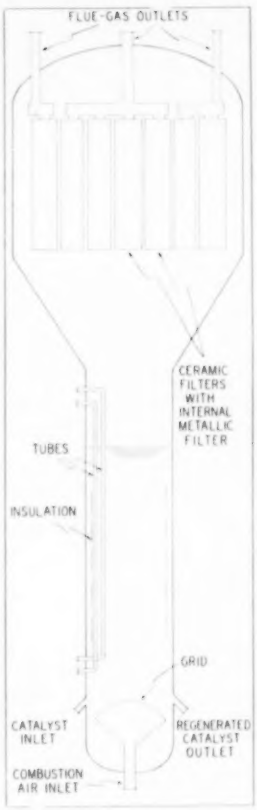

Fig. 2—Schematic drawing of the Destrehan regenerator.

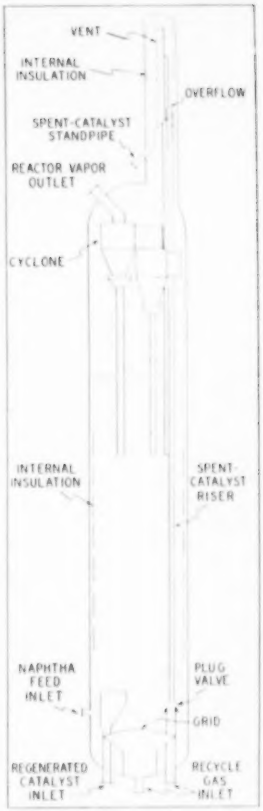

Fig. 3—Main features of the Destrehan reactor.

Regenerator venting . . . The design requirements of this regenerator vent system differs from that of a conventional cracking unit in that it is necessary to dissipate 250 lb. across the control valves and stack. It was felt that with the installation of filters for the removal of catalyst from the flue gas stream, the problem of erosion would be negligible. Due to this factor, standard valves were used in the vent system to control the pressure on the regenerator and to dissipate the differential between the regenerator operating pressure and atmosphere.

Two alternate control valves are provided so that a spare will be available if the working valve should become eroded by catalyst in the event of filter failure. Downstream of the control valves are two hand-operated glove valves in series, which are intended for

throttling to reduce a large part of the total flue-gas pressure. A surge drum is located between the automatic and manual valves to dampen pressure fluctuations. A silencer was also used in this system to reduce the noise level.

On the larger units now under design and construction, the filter assemblies are replaced by conventional cyclones for dust recovery. In such a design, there will be catalyst in the flue gas and, therefore, it is necessary to design the stack control valves for erosive conditions. These will be plug-type valves, two in series with the valve controlling regenerator pressure, taking a maximum drop of approximately 50 psi. and the second valve taking approximately 150 psi. The remainder of the pressure drop will be reduced by perforated baffle plates in stack. Two identical stacks will be installed to allow maintenance on the pressure-reducing valves while the unit is in operation.

Filter blowback system . . . In order to control the pressure in the regenerator, it is necessary to keep the pressure drop through the filters below a set maximum differential. The pressure drop through the filters increases during its service due to a cake of catalyst building up on the outside and to remove this catalyst, it is necessary to impose an internal pressure on the filter greater than the regenerator pressure to spall the cake off the filter. This is accomplished by means of the blowback system. The filters are subject to thermal shock and, therefore, the air is preheated to the same temperature as the flue gas leaving the regenerator. This is accomplished by the use of a small helical coil furnace supplied for this duty.

The blowback is controlled by an automatic time-cycle instrument. The instrument is furnished with an adjustable range, so that the cycle may be varied from 4 to 40 minutes. Through operating experience, the length of the blowback cycle can be determined by the pressure buildup across the filter bank and the automatic timer set to hold the pressure drop below a suitable maximum.

A three-way valve controls the blowback to each individual filter bank. In one position the valve permits the flue gas to enter the flue-gas stack. In the other position it allows the blowback air to enter the filter bank. The valve is actuated by a pneumatically operated cylinder.

Power air is directed to either side of the cylinder by a four-way two-flow pilot valve which is a snap-action mechanism actuated by a spring-loaded pneumatic diaphragm. The movement of the diaphragm is controlled through another three-way valve in the cycle timer.

A complete cycle is finished when each of the four banks has been on the blowback service.

Reactor vessel . . . The reactor has been designed to meet the requirements of the A.P.I.-A.S.M.E. Code. This vessel has a joint efficiency of 95 per cent as it is X-rayed and stress relieved. The Destrehan reactor shown in Fig. 3 is 7 ft. 1 in. i.d. of steel and, therefore, was completely shop fabricated. In the largest unit under construction this vessel is 20 ft. i.d. of steel and must be field erected. The stress relieving will be done after erection, posing an additional construction problem.

The design metal temperature is lower than the working flow temperature as the vessel is lined to reduce the metal temperature. This lining is 5 in. thick and consists of 4 in. of insulating concrete and 1 in. of refractory concrete reinforced with hex steel secured to the shell by Nelson studs. This installation is similar to that used in catalytic cracking vessels.

The vessel is constructed of carbon steel including cyclones, braces, and clips. The grid is constructed of 18-8 chrome, nickel steel, and internal piping of A106, Grade "A," seamless steel.

The spent-catalyst hopper which is placed eccentric to the center of the reactor vessel is constructed to A.P.I.-A.S.M.E. Code and has a joint efficiency of 80 per cent. This section was installed in the field. It is sealed from the reactor section by an internal pipe sleeve welded to a cone extending from the reactor shell. It is also internally lined in the same manner as the reactor in order to reduce the metal temperature and is constructed entirely of carbon steel.

One set of two-stage cyclones have been installed in the reactor to remove the entrained catalyst in the reactor effluent stream. These are conventional unlined cyclones which have an expected recovery efficiency of 99 per cent.

Reactor feed distributor . . . The feed to the reactor consisted of recycle gas and naphtha. These two constituents must be brought in intimate contact in the bed of catalyst in order to produce the desired reaction. Due to the elevated temperature of the recycle gas stream, it is undesirable to have the gas and naphtha in contact without the presence of the catalyst for an appreciable period of time, as thermal cracking of the naphtha may result. In a small unit such as the one now in operation, it is a relatively simple matter to inject the naphtha into the catalyst bed at a number of points around the periphery of the bed and obtain satisfactory distribution across the bed. The recycle gas is brought in under a perforated grid at the bottom head and in this manner evenly distributed.

As the diameter of the reactor increases, the problem of uniform distribution of both recycle gas and naphtha throughout the entire bed becomes more difficult. It has been proposed to mix the recycle gas and naphtha at the nozzle in the bottom head and distribute it across the bed by means of a multiarmed distributor. The volume of this distributor would be kept to a minimum in order to decrease the residence time and thus decrease the amount of thermal cracking of the naphtha feed. Another proposal would inject the naphtha under a grid through a central riser pipe with the recycle gas entering through the annular space. The latter method permits the recycle gas to pick up catalyst before coming in contact with the naphtha and thus reduces the possibility of thermal cracking.

Catalyst storage . . . The catalyst-storage drum is designed for the combined inventory of the catalyst process vessels. On the larger units, two storage drums are provided; one drum to contain the fresh catalyst and the other to receive the unit inventory when the process vessels are emptied during shutdown. The storage drums are designed for low pressure and a maximum temperature of 650° F.

The storage drum is provided with two parallel sets of porous metal filters. These filters are installed to prevent catalyst loss by entrainment during loading and unloading operations. There are blowback lines to each filter to clear the elements from the filter cake.

The operating conditions of the unit are such that a catalyst transfer drum is required to make catalyst additions during operations and to withdraw catalyst for the system. The drum is designed for an operating pressure above 250 psig. and a temperature of 1,000° F. It is internally lined with 4½ in. of insulating and refractory concrete to reduce the design metal temperature to 650° F. The joint efficiency is 85 per cent as the vessel has been stress relieved.

Two metallic filter elements are installed in the top head to eliminate catalyst loss by entrainment while loading or depressurizing. These filters are designed for manual blowback.

Catalyst slide valves . . . Catalyst flow in the spent and regenerated catalyst transfer lines is controlled by slide valves. The valves are conventional plug valves which have been modified to admit air or bleed gas to the valve

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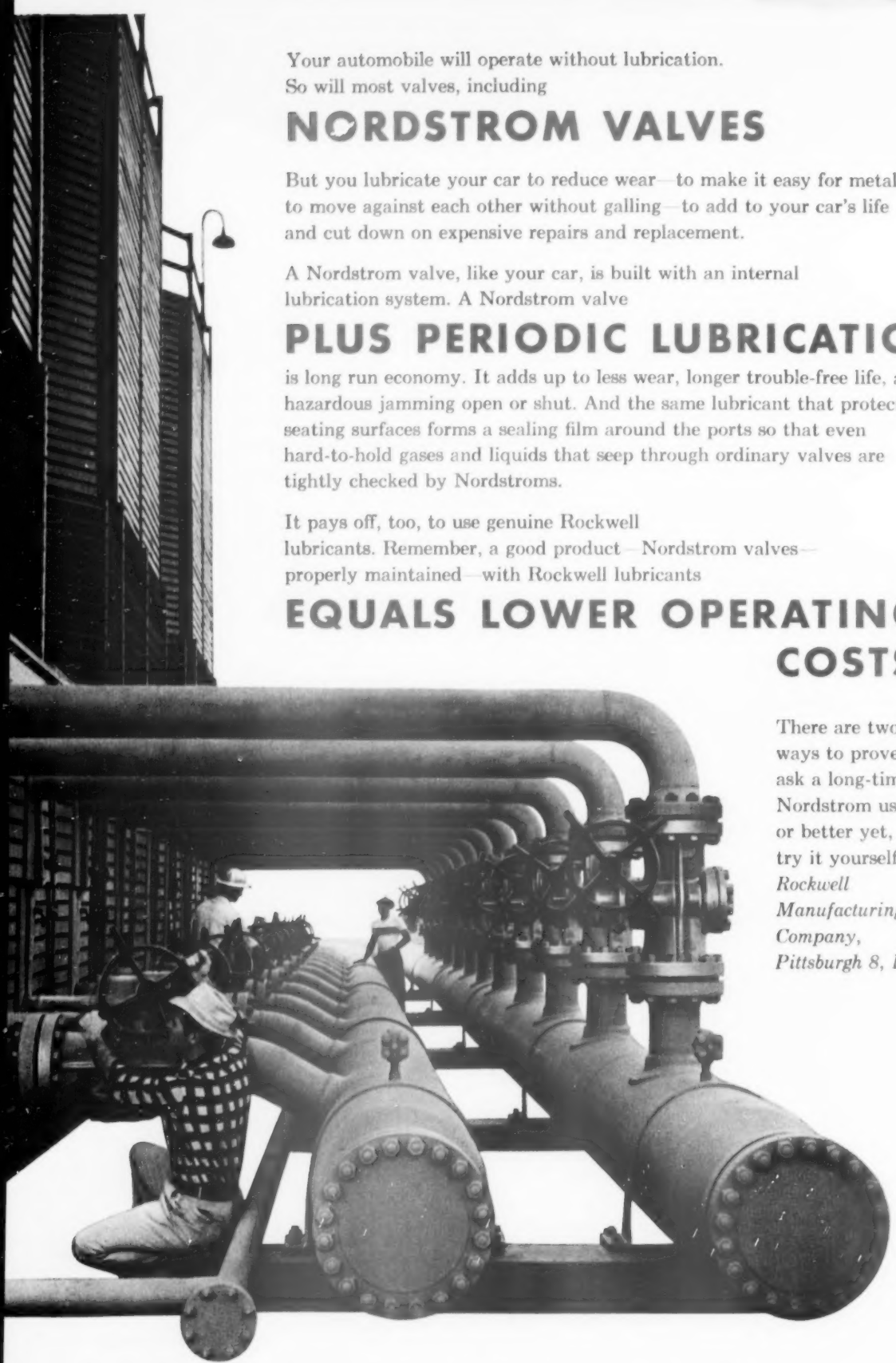

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body inboard of the packing chamber to prevent catalyst from entering. The amount of bleed is controlled by a restriction orifice in order to prevent the erosion of the valve stem.

The valve movement is regulated by a Conotrol positioning device. The air-pressure signal from the primary control instrument, an index of valve position, and operating air at reduced pressure are fed into the positioner. The valve position is registered by means of a metallic tape fastened to an arm on the valve stem and the motion is transmitted to the positioner by the tape through a cam and cam follower which registers in the Conotrol device.

The positioner through an auxiliary pilot directs high-pressure air to the forward or reverse ports of a pneumatic motor which is a piston-type rotary motor capable of movement in either direction.

The motion is transmitted to the valve stem through a limitorque gear train. This mechanism is equipped with two limit-switch devices to prevent excess torque in either direction. The valve-closing limit switch trips a poppet valve that shuts off the power air to the driving motor. The other limiting device working through a mechanical linkage from the gear train trips a second poppet valve, shutting off the air to the motor. Both poppet valves are automatically reset by movement of the motor in the reverse direction.

These valves may be moved manually by means of a handwheel engaged by a clutch lever.

Bleed and aeration . . . The problem of bleed and aeration mediums on a hydroformer is much greater than on a catalytic cracking unit due to the nature of the process. In the hydroformer unit, the vapor in the reaction section consists in the most part of hydrogen gas and the gas in the regeneration section contains oxygen.

It is, therefore, important that the proper bleed mediums in the various parts of the system be chosen to minimize the hazards of combustion. The choice of bleed and aeration medium on the vessels presents no problem. On the reactor hot recycle gas from the discharge of the gas compressor can be employed. Bleed and aeration on the regenerator can be taken directly off the discharge of the combustion air compressor. Choice of bleed and aeration medium for the two transfer lines create quite a different problem. The original design called for recycle gas as aeration on the reactor side of the regenerated and spent-catalyst valves. Air was specified for the regenerator side of these valves.

Experience on the hydroformer now in operation showed that a reversal of flow in either of the two lines results in combustion of bleed gas. The redesign of these systems has changed the bleed medium to an inert gas and the aeration medium to steam. In addition to this change in bleed gas, the unit was also equipped with remote-operated shutoff valves at the reactor and regenerator which are actuated by a loss in differential across a slide valve to further prevent a backflow of gas through the line. The use of steam for the instrument bleeds was considered and dismissed due to a probability of mudding up the catalyst at these points which would render the instruments inoperable. The inert gas used in the operating unit is nitrogen.

Bibliography

1. Seebold, J. E., Bertetti, J. W., Snuggs, J. F., and J. A., Petroleum Refiner, 31, No. 5, 114 (1952).
2. Shepardson, R. M., Tyson, C. W., and Voorhies, A., The Oil and Gas Journal, 51, No. 2, 110 (1952).
3. Gunness, R. C., Chemical Engineering Progress, 49, No. 3, 113 (1953).

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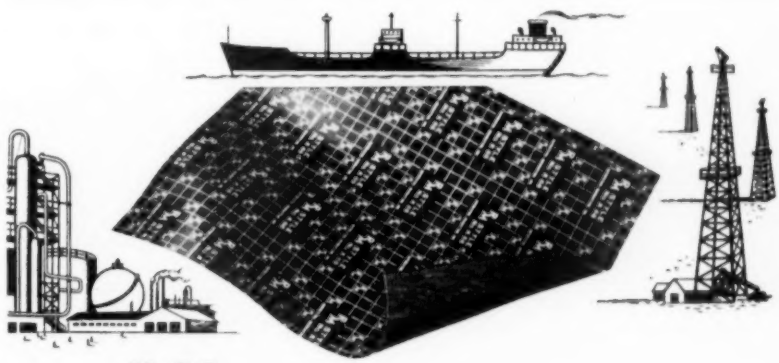

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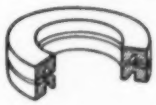

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Fig. 1—Photo of dispatcher's office at McPherson showing manual motor starters and control board.

Here's How N.C.R.A. Operates

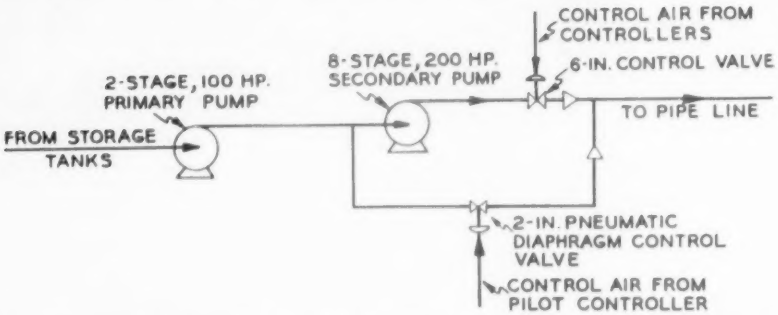

CONTROL AIR FROM CONTROLLERS
8-STAGE, 200 HP. SECONDARY PUMP
6-IN. CONTROL VALVE
2-STAGE, 100 HP. PRIMARY PUMP
TO PIPE LINE
FROM STORAGE TANKS
2-IN. PNEUMATIC DIAPHRAGM CONTROL VALVE
CONTROL AIR FROM PILOT CONTROLLER

Fig. 2—Diagram of McPherson piping and control, showing 2-in. starting pressure control valves and 6-in. operating control valve.

Remote-Controlled Boosters

by L. N. Young

A DESCRIPTION of remote-controlled booster stations on the National Cooperative Refinery Association products line system has been given previously *(The Oil and Gas Journal, August 25, 1952, page 100, and September 21, 1953 page 288.)* The article will go into greater detail on operation, including: (1) starting procedure at the main station, (2) pressure-control system at remote-controlled booster stations, and (3) measures taken to eliminate surging of control valves at high pressure drop.

Products line . . . The N.C.R.A. system is a 227-mile, 6-in. line running from the N.C.R.A. refinery at McPherson, Kans., to the Irvington, Neb., and Council Bluffs, Iowa, terminals. The main station and dispatching center is located at McPherson with remote controlled booster station at Abilene, Kans., Blue Rapids, Kans., and at Tecumseh, Neb. The modernized facilities were construted by Refinery Engineering Co., Tulsa.

Author is superintendent of pipe lines, National Cooperative Refinery Association, McPherson, Kans.

1. Starting at McPherson

Manual starters for the two pumps located at McPherson are shown at the left in the photo, Fig. 1. These starters were existing equipment and were adapted to the present operation to avoid the purchase of additional magnetic starting equipment.

Control board . . . The equipment shown on the control board (Fig. 1) was added. Two ammeters, a spare ammeter, and a voltmeter were installed to aid the dispatcher in starting the motors located in the pump house. As the motors reach synchronous speed, the ammeters will return to no load reading, indicating that the motors are across the line.

The station discharge valve may be opened, closed, or stopped by push button. A pneumatic pressure recorder is also provided. This is a three-pen instrument, recording suction pressure to the station, discharge pressure of the primary pump, and discharge pressure of the station. Two flush-mounted Fisher Wizard pilot controllers were installed at McPherson. One of these operates the 2-in. starting pressure-control valve. The other controls the 6-in. operating control valve.

Starting procedure . . . Fig. 2 shows control arrangement at McPherson. The primary pump is a two-stage pump connected to a 100-hp. electric motor. The eight-stage pump is connected to a 200-hp. motor.

The McPherson station is located at an elevation above the Abilene station equivalent to a head of 175 psi. This requires that the Abilene station be started as follows:

1. The starting pilot controller at McPherson is set to control the line pressure to Abilene through a 2-in. air-operated control valve. The primary pump at McPherson is started manually. The dispatcher waits until the pressure reaches 225 psi. at Abilene, then he dials the motor start code to Abilene.

2. While the Abilene motor is starting the dispatcher continues dialing Abilene on the telemetering system until the suction and discharge pressures indicate that the Abilene station is in operation.

3. The secondary motor at McPherson is started 90 seconds after dialing motor start code to Abilene (time necessary for suction valve to open). This starting procedure enables the pressures at McPherson and Abilene to rise together and the diaphragm control valve at Abilene to position itself quickly.

4. The rate at which pressure rises at Blue Rapids and Tecumseh may be controlled after Abilene is in operation by the amount of pressure developed at McPherson.

2. Abilene and Tecumseh Stations

The control system, including the temporary protection system Mercoids, at Abilene and Tecumseh stations is shown in Fig. 3. The suction Mercoids are set at a minimum pressure of 10 psi. and a maximum of 300 psi. During the starting of these stations the pres-

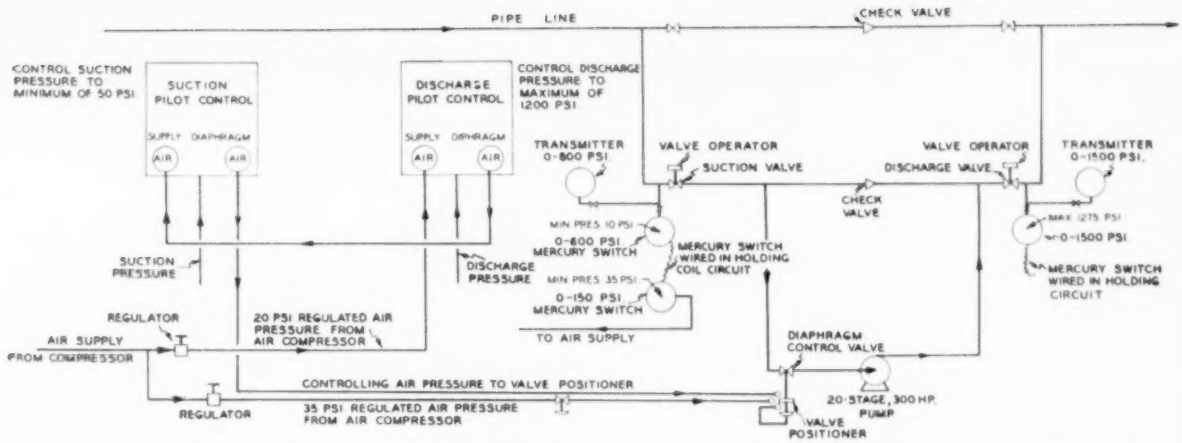


Fig. 3—Tecumseh and Abilene station piping and controls, showing how pneumatic pilot controllers are employed.

sure must remain between these limits. The discharge Mercoid is set at a maximum of 1,275 psi. so that during starting the line pressure must remain below this setting. The control air Mercoid is set at a minimum pressure of 35 psi. while operating pressure of the pilot controllers is 20 psi.

These stations are started by dialing the code from McPherson. The suction valve opens and starts the motor, then the discharge valve opens. As the motor reaches speed and the discharge valve opens, the pilot control and the diaphragm control valve go into operation.

The arrangement of the standard pilot controllers which control the suction and discharge pressures of these stations is also shown in Fig. 3. The instrument air supply is furnished by a small air compressor operating in the pressure range of 60 to 90 psi. A regulator lowers the pressure to 20 psi. going to the pilots. These suction and discharge pressure pilot controllers consist of a flapper-and-nozzle arrangement, bourdon tube, and bleed pilot with fixed orifice. One of these pilots is direct acting, the other reverse acting. Fig. 4 shows the control valve, equipped with Positrol valve positioner and the pilot controllers.

3. Blue Rapids Station

This station was built in 1942 and was redesigned for remote operation according to the scheme presented in Fig. 5. The two pumps used at this station are identical with those used at McPherson. The protective equipment is identical with that at Abilene and Tecumseh and pilot controllers are employed as in Fig. 3, but the starting procedure is different.

Starting of Blue Rapids station was designed so that only one motor would

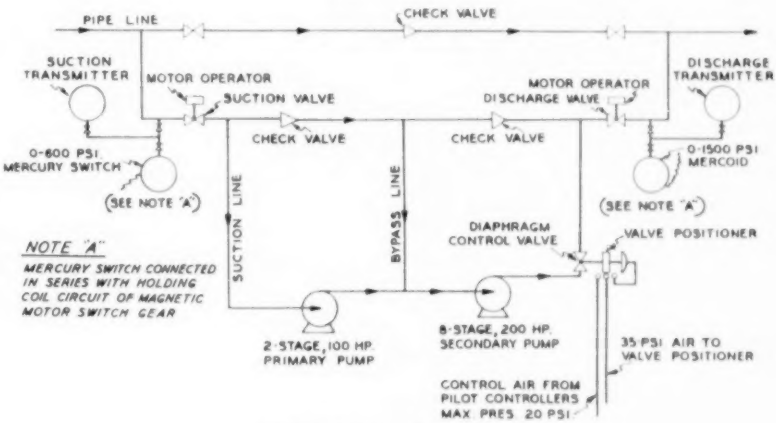


Fig. 5—Blue Rapids piping and control.

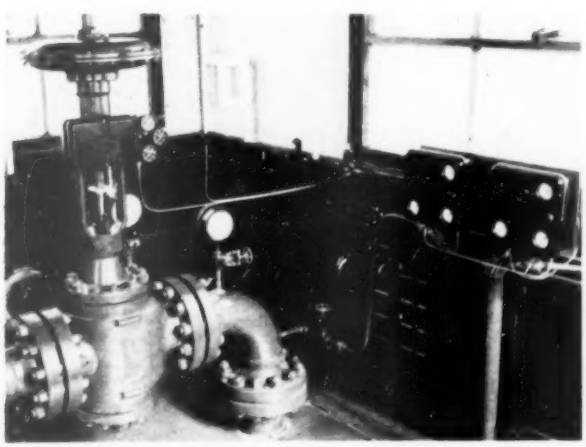


Fig. 4—Photo of Fisher motor valve and two Wizard pilots.

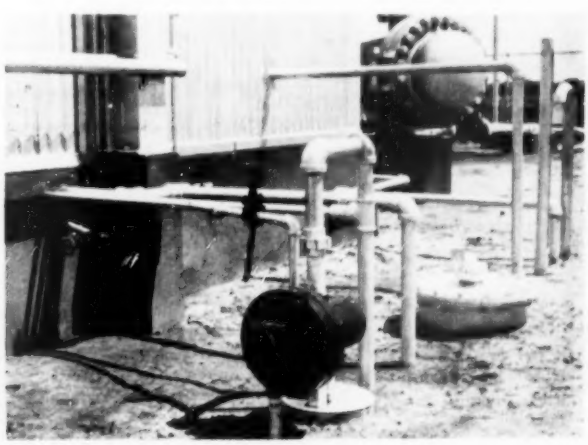
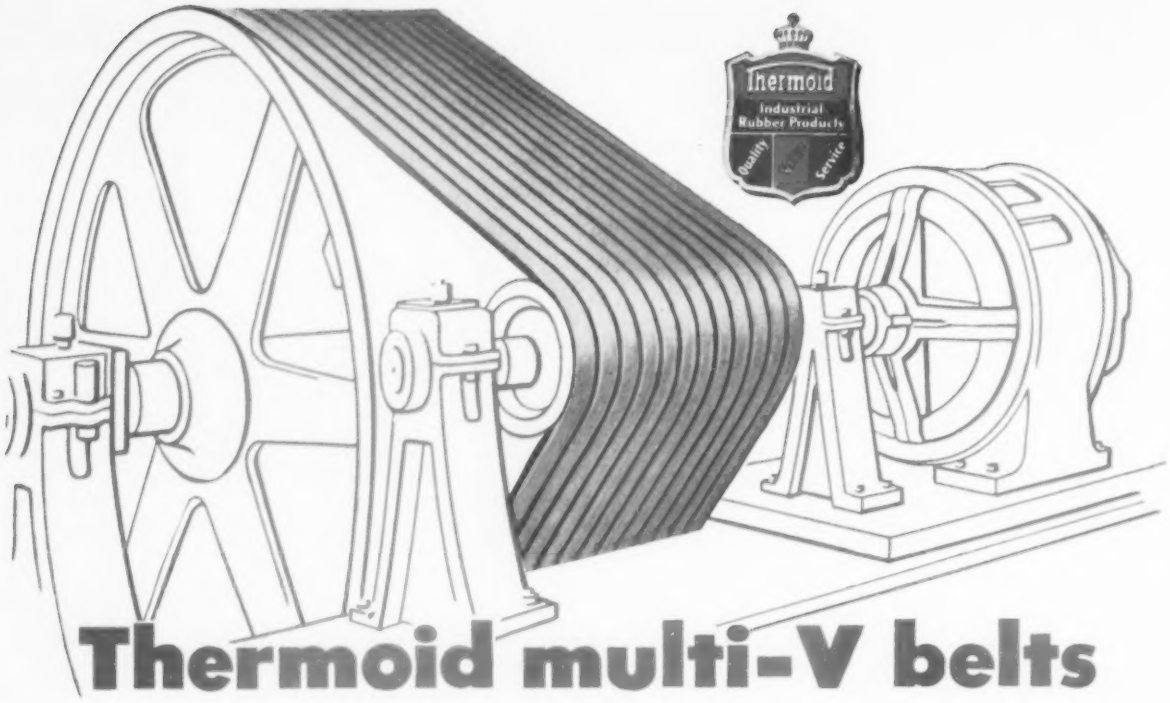


Fig. 6—Photo of seal leakage float control.



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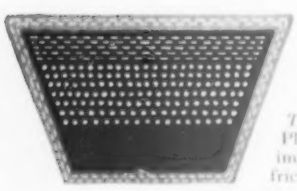

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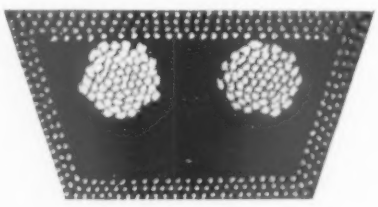

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be on low voltage starting at any one time, due to power load limitations. The suction valve is opened and starts the secondary pump.

This pump takes suction through the check valve and flows around the primary pump in the bypass line. At the same time the diaphragm control valve moves to the wide-open position. As the secondary pump reaches synchronous speed, the primary pump motor is started and it in turn reaches synchronous speed in approximately 10 seconds, the primary pump taking liquid through its own suction line. The starting times of the secondary and primary pump motors are so controlled that the motor-operated discharge valve is closed during starting but opens a few seconds after both motors are up to speed. The diaphragm control valve then takes over and positions itself according to pressure variations which occur during operation.

To recapitulate, the check valves thus operate automatically to supply liquid to each pump during starting. Both pump motors are started against the closed discharge valve. Liquid is not moved through the discharge valve till the second motor is up to speed, then the liquid passes through the station.

4. Eliminate Valve Surge

During those periods of the year when deliveries are at the low point it is necessary to operate the pipe line at reduced capacity, using only the McPherson and Blue Rapids stations which are located 100 miles apart. The other stations (Abilene, between McPherson and Blue Rapids, and Tecumseh, downstream of Blue Rapids) are shut down. Under these conditions difficulty is experienced in controlling the pressure at Blue Rapids. During these periods of low-capacity operation Blue Rapids operates on low suction pressure and the control valve is nearly in the fully closed position. With the Tecumseh station out a large pressure drop must be taken across the Blue Rapids control valve.

All stations were equipped with a 6-in. control valve equipped with double-seated V-ported "pup" (Fisher "proportional uniform percentage") inner valve. These valves operated quite satisfactorily with all stations in operation, but developed a troublesome surge at Blue Rapids when Abilene and Tecumseh were shut down during low-delivery periods.

This surging condition always began when a product change was under way, as when changing from a batch of gasoline to burning oil, say, with McPherson starting to pump gasoline while there was burning oil in the line

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between McPherson and Blue Rapids. A number of devices were installed at different times to correct the surging condition including snubbers, heavier springs for the control valve, valve positioners, etc. While the snubbers did help to eliminate surging the dampening effect was such as to lower sensitivity to the point where adequate control could not be obtained.

A solution to the surging problem was finally found by going to a smaller inner valve, this following from the fact that surge occurred with a high differential pressure across the valve with no valve in the nearly fully closed position. By employing a 4-in. control valve and using a valve positioner and heavy-duty spring set at the same spring pressure as before it was found possible to operate with the valve in a more open position and thus to eliminate the surging.

5. Level Control

The float-type liquid-level controller (Fig. 6) was installed to measure the gland or mechanical seal leakage at all stations. A predetermined volume is allowed to pass through the control. If leakage increases above this amount the float will rise and shut the stations down. This protective device is considered a permanent trouble lockout and the station cannot be started until seal leakage has been brought back to normal. Flow from float chamber to sump is limited by passing through a ¼-in. line. If capacity of this line is exceeded, level builds up to the point where the station is shut down.

Gas Reserves Climb

Proved recoverable reserves of natural gas in the United States last year totaled 199.7 trillion cubic feet, an increase of 5.9 trillion cubic feet over reserves of 193.8 trillion cubic feet a year earlier. These reserves achieved a new record high level after an all-time high production of 8.6 trillion cubic feet of natural gas used in 1952. The previous record production was 8.0 trillion cubic feet of natural gas in 1951.

BOOKS

THIRD REPORT ON COORDINATION OF OIL REFINERY EXPANSION IN THE OEEC COUNTRIES. Published by Organization for European Economic Cooperation, 2, Rue Andre-Pascal Paris 16, France. 90 pp.

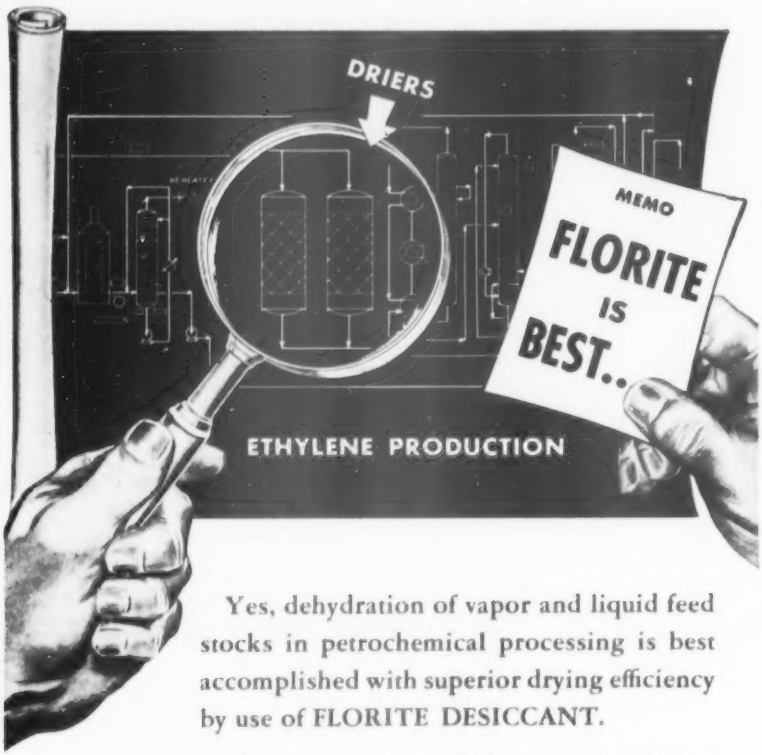
In the first report published in October 1949 were set out the main outlines of a practically new European refining industry, and in the second were filled in a number of important details giving more precise information about some national refining programs and some individual projects. The present report describes against the background of a flattening trend of consumption, the expansion of European refining to the point where substantial exports are being made to outlets beyond the limits of participating countries. The report also discusses the extent to which Western Europe has achieved one of the main purposes of the postwar expansion of refineries, namely, the reduction of its dollar liabilities both for imports of petroleum and for equipment.

THE INSTRUMENT MANUAL. Published by United Trade Press, Ltd., 9 Gough Square, Fleet Street, London, E.C.4, England. 735 pp. £4. 4. 0.

This is the second edition of this work, which is a review of British instrumentation. New sections introduced include aeronautical, navigational, meterological, and surveying instruments, measurement and control of conductivity, telemetering, measurement of viscosity, and nucleonic instruments.

REVIEWS OF PETROLEUM TECHNOLOGY IN 1951. F. H. Garner, E. B. Evans, and George Sell, editors. Published by Institute of Petroleum, 26 Portland Place, London, W.1, England. 385 pp. 50s. post free.

This thirteenth volume covers developments during 1951 and follows in general the lines of its predecessors. Throughout its 21 chapters there are nearly 3,000 references to articles which appeared in the technical press during the period under review, which is some cases covers more than 1 year. As regards this latter point, three chapters cover 1950-51 (Plant Instrumentation, Insulating and Hydraulic Oils, Bitumen), one (Petroleum Waxes) 1949-51, and another (Transport, Storage and Distributtion) 1947-51.



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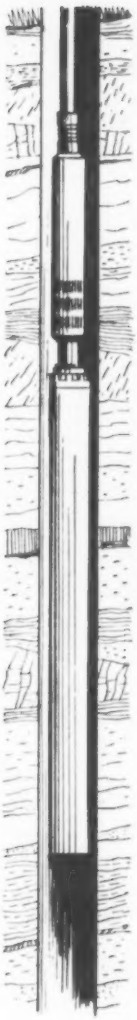

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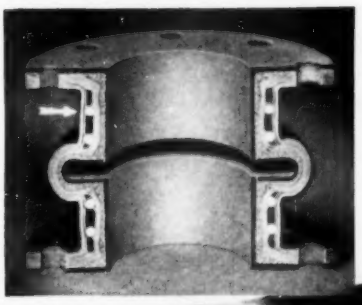
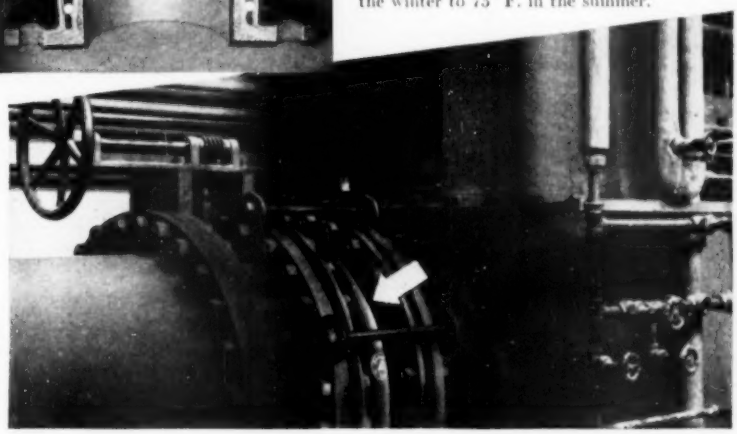


LEFT: Sectional view showing sturdy construction of a Garlock single arch spool-type expansion joint. Arrow points to one of steel reinforcing rings.

BELOW: Garlock 204 spool-type rubber expansion joint installed on a 30" pipe line connecting a propeller-type circulating water pump at the N. Y. State Electric & Gas Corp., Greenidge Station, Dresden, N. Y. The water temperature varies from 33° F. in the winter to 75° F. in the summer.



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2. They do not take a permanent set.
3. For pressures up to 125 p.s.i. (depending upon size of joint); and for vacuum of 30 in. of mercury.
4. Suitable for operating temperatures up to 180° F.
5. They do not corrode or erode.
6. They are light in weight and can be installed in a limited space.
7. They require no gaskets between the flanges of the joint and the flanges of the pipe.
8. They do not induce electrolysis.

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SPECIFIC SPEED, CENTRIFUGAL COMPRESSORS—1

Why Specific Speed?

by Harold Woodhouse

Specific speed has been used for some time as an aid in the design and selection of centrifugal pumps. The centrifugal compressor is employed in refinery processing and is currently finding new application in pipe-line work. Therefore, the concept of specific speed is extended to the compressor in this new series of the Engineering Reference Section. Most pipe-line personnel are not too familiar with the use of specific speed. Even centrifugal-compressor designers have so far used this concept only to a limited extent. This series is tailored to the requirements of the pipe-line engineer and to the generally accepted standards presently employed in design of such units. The author is chief engineer for Dean Hill Pump Co.

OPERATORS and purchasers of centrifugal pumps and compressors are often not clear as to what factors determine the use of either a radial, Francis, or mixed-flow impeller.

The type of impeller for centrifugal machines such as hydraulic turbines, centrifugal pumps, centrifugal blowers, and compressors, can be selected by the application of one simple equation.

The use of this equation results in an answer which is a whole number known as the "specific speed," lying somewhere in the range of 300-15,000, for almost all conditions.

Originally it was used only by hydraulic turbine designers. The specific-speed equation gave the r.p.m. at which a hydraulic turbine would have to operate to develop 1 hp. when supplied with a water power supply having 1-ft. head and flowing at 1 g.p.m. Later, probably about 1933, the specific-speed criterion was extended to centrifugal, Francis, mixed-flow, and propeller pumps.

For pumps, the specific speed is defined as the speed at which the pump would have to operate to develop 1-ft. head when delivering 1 g.p.m.

For Compressors

While there has been no general acceptance of the concept of specific speed as applied to centrifugal blowers and compressors, the same reasoning can be applied and similar conclusions drawn. For centrifugal, Francis, mixed-flow and axial blowers and compressors, the specific speed is that speed at which they must operate to deliver 1 cu. ft. of gas a minute at inlet conditions against 1-ft. head.

The Equation

Mathematically, the specific speed equation, which has been developed elsewhere, is as follows:

$$N_s = \frac{N\,(Q)^{1/2}}{H^{3/4}}$$

where, for blower and compressor application, the terms are as follows:

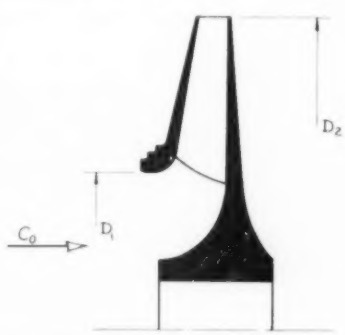

Fig. 1—Illustrating the dimensions D_1 and D_2, inlet eye diameter and outside diameter of impeller, respectively, for typical single suction radial impeller.

N_s = specific speed
N = normal operating r.p.m.
Q = flow, measured in cubic feet per minute, at inlet conditions
H = static head in feet, calculated on an adiabatic basis

(Editor's note: Strictly speaking, the specific-speed equation is a dimensionless expression in the same way that Reynold's number is dimensionless, and the proper units should be used to make it dimensionless. However, current practice prefers the form of the equation with the units given here as being more convenient for practical application.)

The equation for specific speed may be expressed in terms of the impeller dimensions and the equation in this form demonstrates that the greatest single factor influencing the specific speed is the ratio:

$$D_2/D_1 \quad \text{(see Fig. 1)}$$

where:

D_2 = outside diameter of the impeller
D_1 = inlet eye diameter of the impeller

Approach Velocity

In order to obtain high efficiencies it is a general practice in the pipeline industry to design for quite conservative velocities throughout the compressor. So, a value of 75 ft. per second for the approach velocity C_o can be considered a normal figure, and this will determine the size of D_1 for a given flow at specified inlet conditions and conversely.

With C_o and D_1 fixed independently of the type of impeller to be used the determining factor affecting the type and, simultaneously, the specific speed, will be the outside diameter D_2 necessary to develop the requisite head or, one might say, pressure ratio.

Reference

1. Centrifugal Pumps and Blowers, Austin H. Church, Wiley & Co., New York, first edition, 1944, pp. 49-67.

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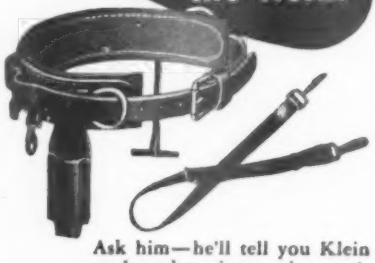

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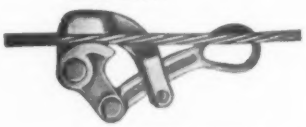

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by W. L. Nelson
Technical Editor

COST-imating

Refinery Construction Costs Increase Slightly

THE cost indexes shown on this page may be used to bring the prices of the Cost-imating Series (October 21, 1948, through December 29, 1949) to current prices. Similar itemized cost indexes are published quarterly in the first weekly issues of January, April, July, and October. In addition, the Nelson Refinery Construction Index appears in the first weekly issue each month on the Refining page of The Oil and Gas Journal.

Wages and materials have been mounting steadily upward during recent years as follows:

	Since the year				Since Dec.
	1946	1950	1951	1952	1952
Materials, per cent	69.7	11.4	3.6	3.2	2.0
Wages, per cent	70.4	11.8	11.2	4.5	0.5

Thus, labor has been greatly favored compared with the wage rates of 1951 (and to some extent since 1952) but a balancing of this situation or a reversal of it has occurred since December 1952. The ever-increasing wages during 1946-1952 have continually required an increase in the prices of materials whereas it now appears that a slight adjustment in wages may not require further increases in price. This can possibly lead to an extended period of prosperity provided taxes remain stabilized and catastrophies do not intervene.

Itemized Cost Indexes

(Multiply the 1946 prices of the Cost-imating Series by these Index Numbers divided by 100)

	1948	1949	1950	1951	1952	May 1953	References*	Index for earlier years (The Oil and Gas Journal unless noted) in Cost-imating issues
Labor:								
Skilled construction	125.0	133.9	140.0	148.3	157.9	164.2	Eng. News Record	No. 55—Nov. 3, 1949
Common labor	131.0	140.4	148.1	156.8	168.2	176.6	Eng. News Record	No. 55—Nov. 3, 1949
Refinery construction	128.0	137.1	144.0	152.5	163.1	170.4		No. 61—Dec. 15, 1949
Refinery operation	126.0	132.9	137.6	149.1	155.1	161.9	Sur. of Current Business	No. 55—Nov. 3, 1949
Equipment or materials:*								
Boilers, tanks and sheet metal	†140.0	†134.8	†136.0	†156.1	†153.4	†149.9	Code 10-72	April 21, 1952§
Boiler tubes, 2-2¼ in.	†135.0	140.9	149.5	163.3	168.8	173.8	Code 10-14-61	
Building materials (nonmetallic)	147.1	151.2	154.8	164.3	164.4	169.6	Code‡ 13	No. 22—Mar. 17, 1949
Brick—building	122.8	127.7	132.5	141.2	140.6	142.6	Code 13-41	No. 20—Mar. 3, 1949
Brick—fireclay	133.3	139.8	153.4	165.3	167.1	173.3	Code 13-42	
Castings (foundry products)	144.6	150.5	152.9	167.2	168.0	175.8	Code 10-15	No. 46—Sept. 1, 1949
Clay products (structural, etc.)	121.3	126.0	134.6	145.2	145.8	149.0	Code 13-4	No. 20—Mar. 3, 1949
Concrete—ingredients	119.4	123.7	125.3	132.7	132.7	138.4	Code 13-2	No. 22—Mar. 17, 1949
Concrete—products	118.9	121.7	124.4	132.8	132.6	136.2	Code 13-3	
Electrical machinery	127.6	130.9	134.9	154.3	152.4	155.0	Code‡ 11-7	See Marshall-S. (below)
Electrical motors and generators	128.6	128.7	135.0	155.8	154.6	157.1	Code‡ 11-73	No. 31—May 19, 1949
Electrical transformers, etc.	127.0	129.7	131.6	147.7	148.0	153.2	Code‡ 11-74	No. 31—May 19, 1949
Engines (composite)	116.9	124.8	126.0	146.1	146.5	147.8	Code‡ 11-54	No. 36—June 23, 1949
Exchangers	130.0	133.0	140.0	152.0	165.8	172.4	Manufacturer	No. 2—Oct. 28, 1948
Fans and blowers	131.3	152.2	162.9	190.1	183.7	180.8	Code 11-47	Feb. 17, 1949§
Hand tools	125.2	134.0	143.2	154.2	155.1	164.8	Code 10-42	
Instruments (composite	120.0	123.1	127.8	142.3	146.2	148.1	Manufacturer	No. 34—June 9, 1949
Flow meter (mechanical)		109.2	114.0	126.8	132.3	135.0	Manufacturer	No. 34—June 9, 1949
Flow meter (air control)		132.4	138.5	157.6	160.5	162.0	Manufacturer	No. 34—June 9, 1949
Flow meter (remote)		130.2	135.5	151.7	155.2	157.0	Manufacturer	No. 34—June 9, 1949
Potentiometer, 6-point		125.8	134.0	146.6	151.5	154.0	Manufacturer	No. 34—June 9, 1949
Potentiometer, air control		131.6	134.1	136.8	144.9	149.0	Manufacturer	No. 34—June 9, 1949
Pressure controller recorder		130.2	135.6	153.3	158.4	161.0	Manufacturer	No. 34—June 9, 1949
Pressure gage		100.0	101.2	108.6	108.6	108.6	Manufacturer	No. 34—June 9, 1949
Thermometer (recording)		118.6	124.0	144.3	149.4	152.0	Manufacturer	No. 34—June 9, 1949
Control Valve		129.8	133.3	155.5	155.5	155.5	Manufacturer	No. 34—June 9, 1949
Insulation materials	126.8	123.6	125.0	128.8	130.4	132.6	Code 13-72	
Lumber (composite)	181.0	165.3	193.0	208.5	203.2	208.0	Code 8-1	No. 7—Dec. 2, 1948
Lumber (Southern Pine)	174.3	157.7	176.9	189.1	191.2	190.7	Code 8-12	No. 7—Dec. 2, 1948
Lumber (other soft woods)	206.5	203.9	230.2	252.7	248.5	261.6	Code 8-13	
Machinery—general purposes	124.9	131.9	136.7	153.0	151.8	153.3	Code 11-4	Feb. 17, 1949§
Machinery—construction	127.8	136.0	140.1	155.3	157.5	162.1	Code 11-2	
Machinery—oil field	†125.9	†132.9	†135.8	†149.6	†149.9	†153.0	Code 11-51	
Paint and paint materials	143.0	141.2	136.9	153.9	151.9	150.0	Code 6-2	No. 22—Mar. 17, 1949
Paints—prepared	141.4	142.8	140.0	153.8	155.7	156.2	Code 6-21	
Pipe, sewer	†119.1	†119.3	†129.9	†147.1	†146.6	†148.2	Code 13-45	No. 22—Mar. 17, 1949
Pumps, air compressors, etc.	127.0	135.9	138.2	155.9	155.6	160.1	Code‡ 11-41	No. 29—May 5, 1949
Steel (iron and steel)	141.1	143.3	152.9	166.7	168.5	174.1	Code 10-1	No. 61—Dec. 15, 1949
Steel—finished steel	160.4	173.8	182.6	196.9	201.2	212.3	Code 10-14	
Steel—plate and sheet		(See boilers, tanks, etc., above)						
Valves and fittings	†125.9	†132.9	†135.8		†226.0	†235.2	Code‡ 11-49	No. 46—Sept. 1, 1949
Marshall-Stevens equipment (only) indexes:								
Process industries (average)	131.5	131.5	135.8	144.9	145.1	146.0	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Chemical	130.0	130.0	133.8	142.5	142.8	143.5	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Petroleum	132.0	132.0	136.5	145.6	146.0	147.0	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Electrical power	135.0	135.0	139.3	148.3	148.7	149.6	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Refrigeration	141.0	139.9	147.3	159.2	159.7	160.8	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Steam power	132.0	132.0	136.6	146.5	147.0	147.9	Chem. Eng. June 1953	Chem. Eng. Feb. 1951
Nelson Refinery Construction	132.5	139.6	146.2	157.2	163.6	170.1		No. 61—Dec. 15, 1949

*Code refers to the revised index code number of the Bureau of Labor Statistics, U. S. Department of Labor, "Wholesale Prices." †Estimated base value for 1946. ‡Not exactly the same items as those published before July 7, 1952. §Questions on Technology, The Oil and Gas Journal.

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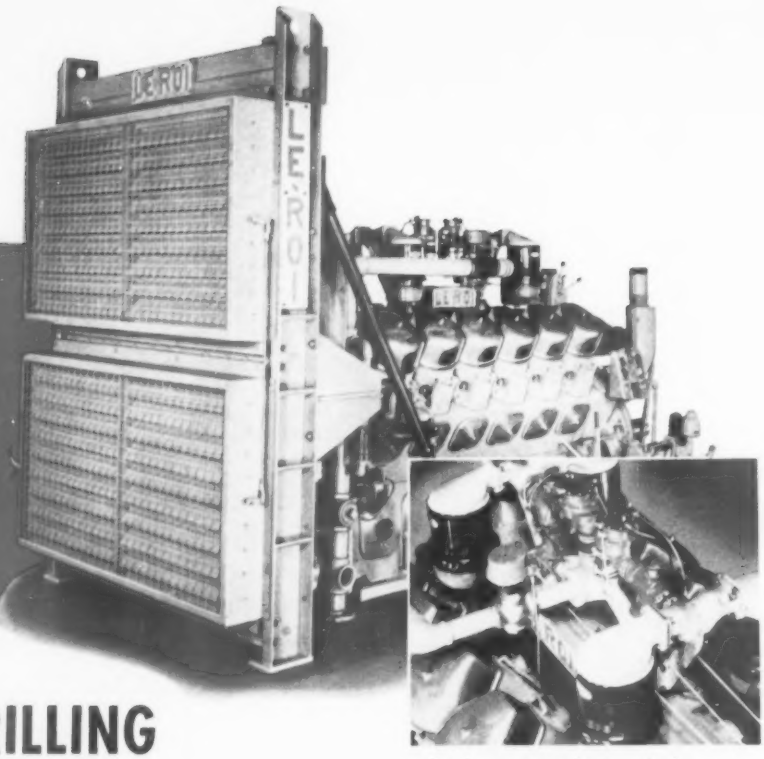

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This advertisement is one of a series.

Better Well Completions With Weighted Oil-Base Mud

USE of small volumes of weighted oil-base mud in well completions and workover operations on the Gulf Coast is resulting in consistently better penetration of oil formations, according to a number of operators following the procedure.

One operator has used this method on 22 completions, 21 of which were successful.

Most widespread use has involved displacement of weighted oil-base mud in the casing opposite the zone to be perforated for completion or drill-stem testing.

Normally, a 10 to 15-bbl. volume, weighted slightly heavier than the fluid in the hole, has proved to be adequate, and experience has shown that it is best to circulate off the top portion of the oil-base "plug" or "pill" before pulling out of the hole after placement. This eliminates any zone of contamination of oil-base and water-base mud which in some cases can become quite thick and restrict passage of the perforating gun at the interface.

Procedures varied . . . Completion procedures are many and varied, but the most commonly used involves perforating through the oil-base-mud plug, or pill, spotted in the casing opposite the producing zone. This eliminates any block in the course of the shot holes by clay particles, and any further water blocking of the oil or gas sand. No attempt is made to wash the perforations with mud, water, or oil.

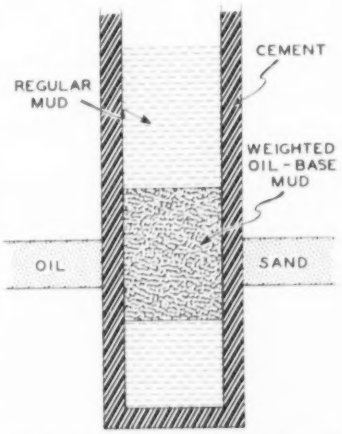
Tubing is run and the well is completed by swabbing in the event mud is left in the annulus above a production packer. Displacement of the clay-water mud with crude oil has been successfully employed also where pressures do not require the setting of a production packer.

The ratio of successful completions of the operator mentioned, who had 21 successes against 1 failure, is about one-to-one in the same area with clay-water mud or brine in the hole at the time of perforating.

Screen set . . . This same operator has set screen after perforating through oil-base mud with very good results, compared with former procedures. Following perforating, the screen liner is run and no attempt is made to wash the perforations or circulate the mud from behind the screen. The filter cake which is deposited by the mud is crude-oil soluable and is dissolved as the well produces. This practice has resulted in savings of as much as 2 days' rig time, by elimination of washing of perforations and attempting to wash the mud from behind the screen prior to setting.

Drill-stem testing . . . If a drill-stem test is desirable, the procedure can be successfully employed if a sufficient volume of the oil-base mud is used to allow a portion to remain above the packer setting. After completion of the drill-stem test, the oil-base mud immediately above the packer will protect the producing zone from the water mud.

"Sand protection" . . . Numerous similar procedures involving use of small volumes of weighted oil-base mud in minor workover operations could well be termed "sand protection." Wells originally completed with clay mud or water in the annulus above the production packer can be killed by displacing some oil-base mud which is heavier than the fluid in the annulus below the packer before releasing it. The same procedure essentially has been successfully used on a wildcat well on drill-stem test where a low-pressure producer was indicated.



OIL-BASE MUD plug is spotted in the well opposite the oil sand. Completions and workover operations can then be conducted more successfully.

In a number of cases, low-pressure wells have been killed with water or clay mud for the purpose of a minor workover, and have either failed to come back in or required an extended cleanout period before returning to normal production. Placement of a small volume of weighted oil-base mud for sand protection has proved advantageous under such conditions.

Producing sands in some instances have been acidized through a retrievable packer. To eliminate a mud or water block after placement of the acid, weighted oil-base mud has been used to follow the acid, thus protecting the producing zone during final completion operations.

Why Oil-Base Mud?

Oil-base mud has proved to be very useful in handling problems where it is necessary to keep water from contacting the formation. Its principal application has been for drilling-in and completion operations in tight, low-pressure formations, or sands containing hydratable clay materials. Oil-base mud prevents water blocking of producing formations. Some producing formations appear to be damaged by water-base drilling fluids, and under such conditions wells drilled in with oil-base muds have proved to be much more productive. Oil-base mud is useful in obtaining cores for connate-water determinations, for reservoir studies. In some areas troublesome sloughing-shale conditions have been overcome by drilling with oil muds.

*Material taken from Principles of Drilling Mud Control, University of Texas Division of Extension, Austin.

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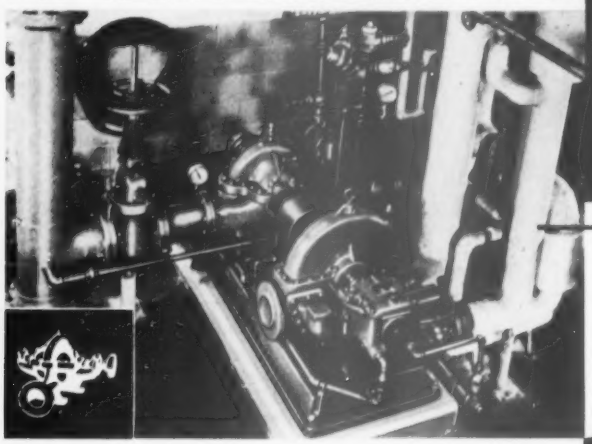

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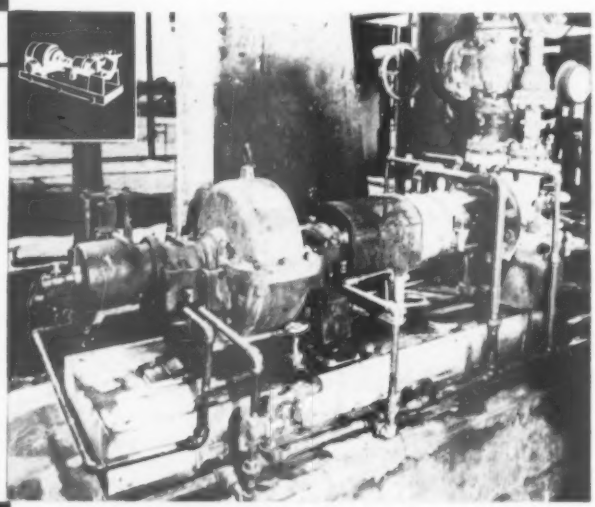
HEAVY DUTY CENTER-LINE MOUNT PUMPS—*The continuous transfer of crude charge stocks at high temperatures is handled by type PR pumps.* The Peerless line of packing gland construction and mechanical shaft seal construction pumps for handling hydrocarbons, chemical solutions and water at elevated temperatures and pressures is most complete. The pump in the view at the right is handling oil at 850° F. in an Oklahoma refinery. These refinery and chemical process pumps have a number of modern design features to recommend their installation. Fully described in Bulletin B-1605.



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How to Compute Correlation Index

by W. L. Nelson
Technical Editor

"Is there a large chart or some way of computing correlation index easily and accurately?"—S. C. H.

The correlation index of the Bureau of Mines is shown in the form of a chart in the original paper by H. M. Smith, Technical Paper 610, U. S. Bureau of Mines (1940) and for many purposes the chart can be read with satisfactory accuracy. Of course, the formula can be used:

$$C.I. = 48{,}640/{}^{\circ}K + 473.7g - 456.8$$

in which "°K" is the boiling point at atmospheric pressure, °C. absolute (°C. plus 273), and "g" is the specific gravity 60/60. Likewise Tables 1 and 2 on this page can be used to solve the formula. A temperature "T" factor and a gravity "G" factor were obtained by rearranging the formula as follows:

$$C.I. = 473.7g - [456.8 - (48{,}640/{}^{\circ}K.)] = G - T$$

The gravity factor "G" and the temperature factor "T" can be read with relative ease from Tables 1 and 2.

Example . . . An oil or hydrocarbon has an A.P.I. gravity of 36.5° corresponding to a "G" factor (Table 1) of about 399.0. The boiling point is 540° F., which corresponds according to Table 2, to a temperature factor "T" of 369.3.

$$C.I. = G - T = 399 - 369.3 = 29.7$$

Table 1—Gravity Factor of the Correlation Index Equation

Gravity 60/60			Gravity 60/60			Gravity 60/60			Gravity 60/60			Gravity 60/60		
A.P.I.	Specific	"G"	A.P.I.	Specific	"G"	A.P.I.	Specific	"G"	A.P.I.	Specific	"G"	A.P.I.	Specific	"G"
0	1.0760	509.7	16.0	0.9593	454.5	32.0	0.8654	410.1	48.0	0.7883	373.5	64.0	0.7238	342.9
0.5	1.0720	507.8	16.5	0.9561	453.0	32.5	0.8628	408.8	48.5	0.7861	372.4	64.5	0.7219	342.0
1.0	1.0679	506.0	17.0	0.9529	451.5	33.0	0.8602	407.5	49.0	0.7839	371.4	65.0	0.7201	341.1
1.5	1.0639	504.1	17.5	0.9497	450.0	33.5	0.8576	406.3	49.5	0.7818	370.3	65.5	0.7183	340.3
2.0	1.0599	502.2	18.0	0.9465	448.5	34.0	0.8550	405.0	50.0	0.7796	369.3	66.0	0.7165	339.4
2.5	1.0560	500.4	18.5	0.9433	447.0	34.5	0.8524	403.8	50.5	0.7775	368.3	66.5	0.7146	338.6
3.0	1.0520	498.5	19.0	0.9402	445.5	35.0	0.8498	402.5	51.0	0.7753	367.3	67.0	0.7128	337.7
3.5	1.0481	496.6	19.5	0.9371	444.0	35.5	0.8473	401.4	51.5	0.7732	366.3	67.5	0.7111	336.9
4.0	1.0443	494.8	20.0	0.9340	442.4	36.0	0.8448	400.2	52.0	0.7711	365.3	68.0	0.7093	336.0
4.5	1.0404	492.9	20.5	0.9309	441.0	36.5	0.8423	399.0	52.5	0.7690	364.3	68.5	0.7075	335.2
5.0	1.0366	491.0	21.0	0.9279	439.6	37.0	0.8398	397.9	53.0	0.7669	363.4	69.0	0.7057	334.3
5.5	1.0328	489.3	21.5	0.9248	438.2	37.5	0.8373	396.7	53.5	0.7649	362.4	69.5	0.7040	333.5
6.0	1.0291	487.6	22.0	0.9218	436.8	38.0	0.8348	395.5	54.0	0.7628	361.4	70.0	0.7022	332.6
6.5	1.0254	485.8	22.5	0.9188	435.4	38.5	0.8324	394.4	54.5	0.7608	360.4	70.5	0.7005	331.8
7.0	1.0217	484.1	23.0	0.9159	434.6	39.0	0.8299	393.2	55.0	0.7587	359.4	71.0	0.6988	331.0
7.5	1.0180	482.4	23.5	0.9129	432.5	39.5	0.8275	392.0	55.5	0.7567	358.5	71.5	0.6970	330.2
8.0	1.0143	480.6	24.0	0.9100	431.1	40.0	0.8251	390.9	56.0	0.7547	357.5	72.0	0.6953	329.4
8.5	1.0107	478.9	24.5	0.9071	429.7	40.5	0.8227	389.7	56.5	0.7527	356.6	72.5	0.6936	328.6
9.0	1.0071	477.2	25.0	0.9042	428.3	41.0	0.8203	388.6	57.0	0.7507	355.6	73.0	0.6919	327.8
9.5	1.0035	475.4	25.5	0.9013	427.0	41.5	0.8179	387.5	57.5	0.7487	354.7	73.5	0.6902	327.0
10.0	1.0000	473.7	26.0	0.8984	425.7	42.0	0.8155	386.4	58.0	0.7467	353.8	74.0	0.6886	326.2
10.5	0.9965	472.1	26.5	0.8956	424.3	42.5	0.8132	385.3	58.5	0.7447	352.8	74.5	0.6869	325.4
11.0	0.9930	470.5	27.0	0.8927	423.0	43.0	0.8109	384.2	59.0	0.7428	351.9	75.0	0.6852	324.6
11.5	0.9895	468.9	27.5	0.8899	421.7	43.5	0.8086	383.1	59.5	0.7408	351.0	75.5	0.6836	323.8
12.0	0.9861	467.2	28.0	0.8871	420.4	44.0	0.8063	382.0	60.0	0.7389	350.0	76.0	0.6819	323.0
12.5	0.9826	465.6	28.5	0.8841	419.0	44.5	0.8040	380.9	60.5	0.7370	349.1	76.5	0.6803	322.3
13.0	0.9792	464.0	29.0	0.8816	417.7	45.0	0.8017	379.8	61.0	0.7351	348.2	77.0	0.6787	321.5
13.5	0.9759	462.4	29.5	0.8789	416.4	45.5	0.7994	378.7	61.5	0.7332	347.3	77.5	0.6770	320.7
14.0	0.9725	460.8	30.0	0.8762	415.1	46.0	0.7972	377.7	62.0	0.7313	346.4	78.0	0.6754	320.0
14.5	0.9692	459.2	30.5	0.8735	413.8	46.5	0.7949	376.6	62.5	0.7294	345.6	78.5	0.6738	319.2
15.0	0.9659	457.6	31.0	0.8708	412.5	47.0	0.7927	375.6	63.0	0.7275	344.7	79.0	0.6722	318.4
15.5	0.9626	456.0	31.5	0.8681	411.3	47.5	0.7905	374.5	63.5	0.7256	343.8	79.5	0.6706	317.7

Table 2—Temperature Factor of the Correlation Index Equation
Subtract T from G

°F.	°C.	"T"	°F.	°C.	"T"	°F.	°C.	"T"	°F.	°C.	"T"	°F.	°C.	"T"
100	38.0	300.4	260	127.0	335.1	420	215.5	357.3	580	304.5	372.6	740	393.0	383.8
110	43.5	303.2	270	132.0	336.7	430	221.0	358.4	590	310.0	373.4	750	399.0	384.4
120	49.0	305.8	280	138.0	338.3	440	227.0	359.5	600	315.5	374.2	760	404.5	385.0
130	54.5	308.3	290	143.5	339.9	450	232.0	360.5	610	321.0	375.0	770	410.0	385.6
140	60.0	310.7	300	149.0	341.5	460	238.0	361.6	620	327.0	375.7	780	415.5	386.2
150	65.5	313.1	310	154.5	343.0	470	243.0	362.6	630	332.0	376.4	790	421.5	386.3
160	71.0	315.4	320	160.0	344.5	480	249.0	363.6	640	338.0	377.1	800	427.0	387.3
170	77.0	317.6	330	165.5	345.9	490	254.5	364.6	650	343.0	377.8	810	432.0	387.9
180	82.0	319.8	340	171.0	347.3	500	260.0	365.6	660	349.0	378.5	820	438.0	388.4
190	88.0	322.0	350	177.0	348.7	510	265.5	366.6	670	354.5	379.2	830	443.0	388.9
200	93.5	324.1	360	182.0	350.0	520	271.0	367.5	680	360.0	379.9	840	449.0	389.4
210	99.0	326.1	370	188.0	351.3	530	277.0	368.4	690	365.5	380.6	850	454.5	389.9
220	104.5	328.0	380	193.5	352.6	540	282.0	369.3	700	371.0	381.3	860	460.0	390.4
230	110.0	329.8	390	199.0	353.8	550	288.0	370.1	710	377.0	382.0	870	465.5	390.9
240	115.5	331.6	400	204.5	355.0	560	293.0	371.0	720	382.0	382.6	880	471.0	391.4
250	121.0	333.4	410	210.0	356.2	570	299.0	371.8	730	388.0	383.2	830	477.0	391.9

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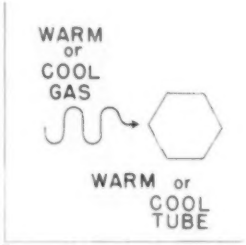
h_f HEAT TRANSFER

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a HEXAGONAL TUBE and a GAS

Gas Movement: Turbulent

Direction of Movement: Normal to tube

Heat Movement: Heating or Cooling



EQUATION:

$$h_f = 0.138 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.638}$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of gas, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of gas, ft./hr.

ρ - Density of gas, lb./cu. ft.

μ - Absolute viscosity of gas, lb./ft. hr.

LIMITATIONS:

Equation suitable for air, or for diatomic or other gases which obey the perfect gas laws.

Applicable to flow rates giving Reynolds numbers ($DV\rho/\mu$) between 5,000 to 100,000.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ -- 130-148, 174-195, 1563.
μ -- 370-374, 1130, 1696.
K -- 409-461, 1303, 1697.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, E. R. G. Eckert, p. 144.

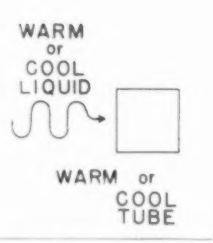
S 1,4 c (2) (a)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a RECTANGULAR TUBE and a LIQUID

Liquid Movement: Turbulent

Direction of Movement: Normal to tube

Heat Movement: Heating or Cooling



EQUATION:

$$h_f = 0.102 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.675}\left[\frac{C_p\mu}{K}\right]$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of liquid, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of liquid, ft./hr.

ρ - Density of liquid, lb./cu.ft.

μ - Absolute viscosity of liquid, lb./ft. hr.

C_p - Specific heat of liquid at constant pressure, BTU/lb.°F.

LIMITATIONS:

Reynolds number ($DV\rho/\mu$) between 5,000 and 100,000.

PHYSICAL CONSTANTS: The values of the physical constants such as density, viscosity and others are reported in the International Critical Tables, in several handbooks, and in the technical literature.

Page references in the Chemical Engineers' Handbook, J. H. Perry (1948) are as follows:

for ρ -- 130-148, 174-195, 1563.
μ -- 370-374, 1130, 1696.
K -- 409-461, 1303, 1697.
C -- 225-235, 297, 1688, 1696.

REFERENCES:

1. Introduction to the Transfer of Heat and Mass, E. R. G. Eckert, p. 144.

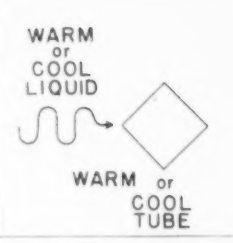
S 2,5 c (1) (a)

COEFFICIENT of HEAT TRANSFER through FILM between OUTSIDE SURFACE of a RECTANGULAR TUBE and a LIQUID

Liquid Movement: Turbulent

Direction of Movement: Normal to tube

Heat Movement: Heating or Cooling



EQUATION:

$$h_f = 0.246 \frac{K}{D}\left[\frac{DV\rho}{\mu}\right]^{0.588}\left[\frac{C_p\mu}{K}\right]$$

TERMINOLOGY:

h_f - Film coefficient of heat transfer, BTU/hr.sq.ft.°F.

K - Thermal conductivity of liquid, BTU/hr.sq.ft.°F./ft.

D - Length of side, ft.

V - Velocity of liquid, ft./hr.

ρ - Density of liquid, lb./cu. ft.

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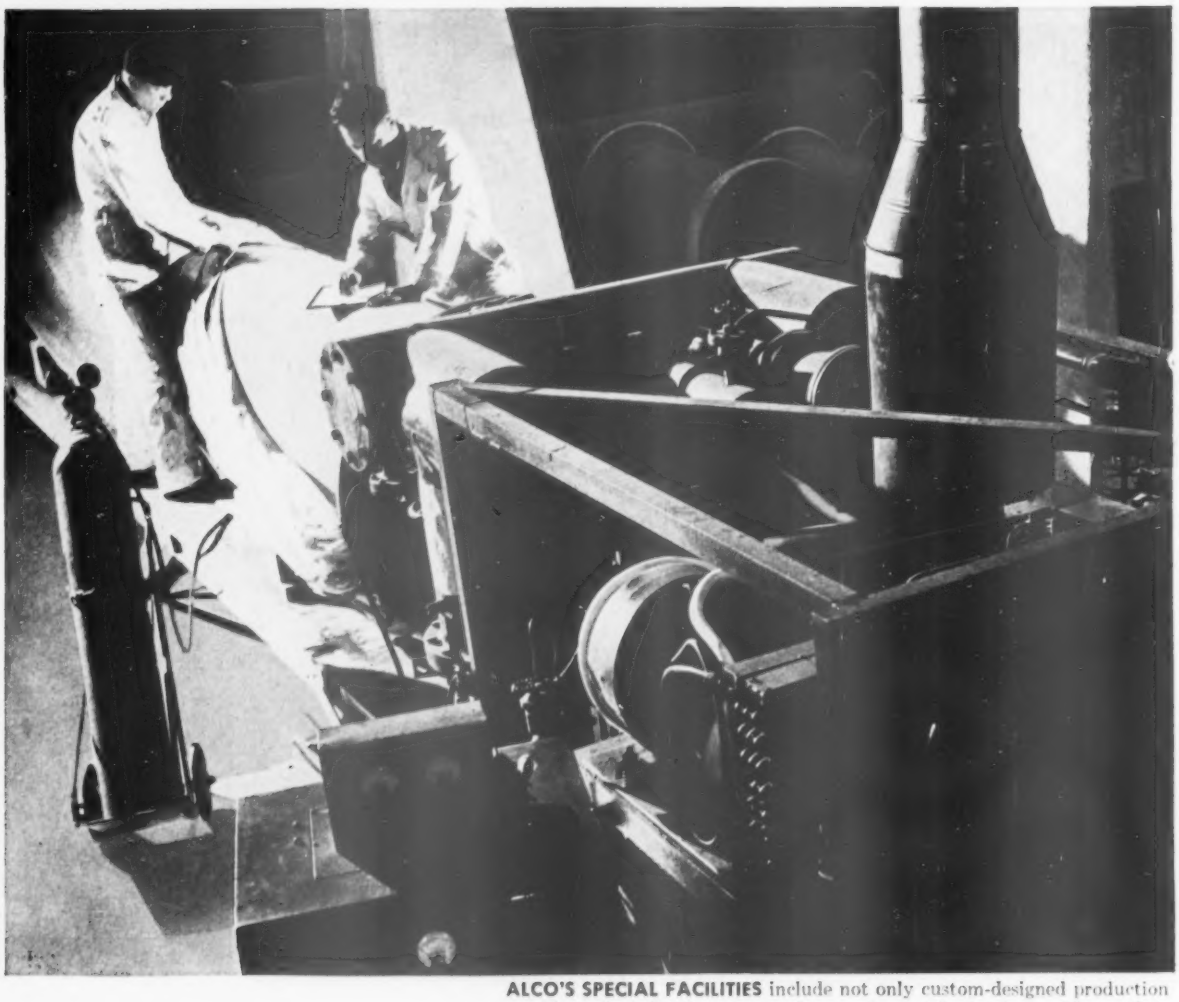


ALCO'S SPECIAL FACILITIES include not only custom-designed production machinery but also the most modern equipment for testing and inspection. Here, for example, Alco technicians use a mass spectrometer to inspect pipe welds for microscopic leaks. The mass spectrometer can detect leaks that would allow only one drop of water to escape in 100 years.

CHANCES are that new demands in your industry have presented you with many problems calling for new and varied types of heavy metal equipment.

If so, take a tip from scores of power and processing companies the world over—*look to Alco for the answers.*

Alco has the facilities required to fabricate heavy metal equipment for almost any purpose (see examples on these pages). Equally important, Alco has the wealth of experience required for the design of that equipment.

We invite you to contact your nearest Alco Products Sales Engineer and give him the details on your most troublesome heavy-equipment problem. He will show you how Alco can design and build the answer that will give you maximum value for your equipment dollar—now and in the years ahead.

Alco Products Sales Offices are located in Dunkirk, New York, Chicago, Los Angeles, Kansas City, Houston, Tulsa and Beaumont.

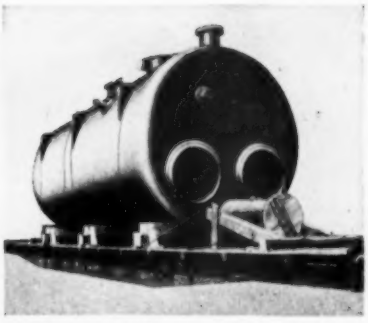
Look to ALCO for...

Answers to

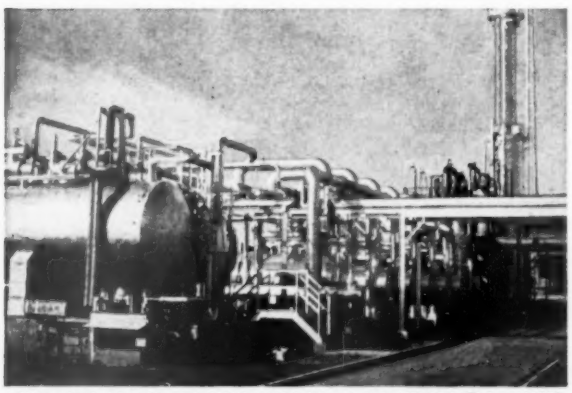
Alco

84-INCH ALCO STEEL PIPE at Croton Falls, N.Y., is part of the gigantic aqueduct system furnishing New York City with approximately 1050 million gallons of water per day. Alco Electric Welded Steel Pipe for interliners was also used in part of the New York City Board of Water Supply's new $44,000,000 East Delaware Tunnel, now nearing completion.

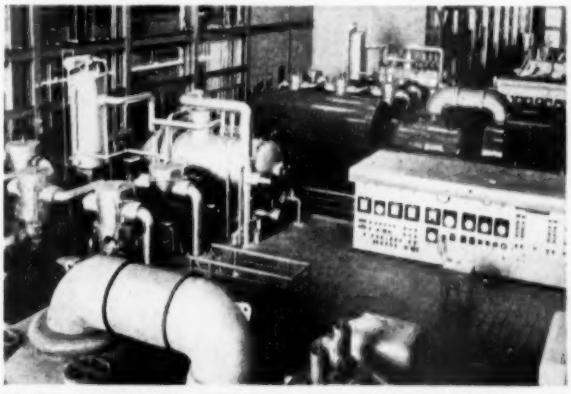
"UNI-BUNDLE UNITS" demonstrate the versatility of Alco Aircoolers. Vertical partitions welded in the headers allow several different vapor or liquid streams to be handled in a combined tube-bundle. Units are shown here at a large Southwestern natural gasoline plant; the one at right not only cools the oil but also condenses the overhead vapor from the steam.



HUGE TAR STILL, equipped with two corrugated furnaces for direct firing, typifies the virtually endless variety of heavy metal equipment built by Alco to meet special customer requirements. This is the type of equipment which has earned for Alco the confidence of power, petroleum and chemical companies all over the world.



REFRIGERANT HEAT EXCHANGERS AND STORAGE TANKS were among the variety of heavy-duty equipment built by Alco for Tennessee Gas Transmission Company's Hydrocarbon Recovery Plant at Gabe, Kentucky. Alco has over 50 years of experience in the design and fabrication of heavy-duty equipment for sub-zero operation.



ALCO FEEDWATER HEATERS AND EVAPORATORS were specified for the two 66,000 kw turbine-generator units installed in 1949 by Philadelphia Electric Company at its modern Barbadoes Island Station. Each evaporator delivers about 20,000 lb of make-up per hour. The feedwater heaters handle 555,000 lb of condensate per hour and deliver feedwater at 406 F.

New Industrial Problems

ALCO

ALCO PRODUCTS DIVISION

AMERICAN LOCOMOTIVE COMPANY • DUNKIRK, NEW YORK

CP DRILL COLLARS

The straight smooth inside bore of all CP Drill Collars eliminates harmful offsets and washouts. CP's special heat treating and boring processes assure uniform, wall-to-wall hardness and precisioned straightness at all sections. Uniform wall thickness assures proper balance to minimize warping and whipping.

All threads are hobbed to maintain accurate thread form. Collars are available in lengths up to 55 feet.

For complete information, write Chicago Pneumatic Tool Company, Oil Tool Division, 1 N.W. 16th Street, Oklahoma City, Oklahoma.

Chicago Pneumatic

IN CANADA: 10103 81st Ave., So. Edmonton, Alberta, Canada. • **IN MEXICO:** Mexico, D. F., Rosas Moreno No. 41; Tampico, Pamps., Apartado No. 174. • **SPECIAL OIL TOOL EXPORT AGENT:** E. F. Gahan, Inc., 500 Fifth Ave., New York 17, N. Y. (West Indies, Central and South America, exclusive of Mexico.)

EQUIPMENT MEN . . . in the News

Hercules Tool Announces New Field Representatives

S. P. Tschappat, president of Hercules Tool Co. of Tulsa, has announced the following additions to the company's field staff.

Thomas R. McIntyre of Calgary, Alta., will represent the firm in Alberta and Saskatchewan, Canada.

W. W. Coonrod, of Great Bend, Kans., has been appointed field representative in Kansas, and A. D. Eastham, of Borger, Tex., will serve Hercules in the Texas Panhandle area.

Forrow to Head Perforated Sales for Kobe, Inc.

E. W. FORROW

E. W. (Al) Forrow has been named manager of perforated sales for Kobe, Inc., according to a recent announcement by L. T. Wold, vice president and general manager of Kobe, division of Dresser Equipment Co. Forrow has been affiliated in the oil-well equipment business since 1919. Starting with Union Oil Co. in Orcutt, Calif., he made the Santa Fe Springs boom in the twenties and since that time he has been active in California, Mid-Continent, Gulf Coast, and South American markets.

Forrow spent 11 years with Security Engineering Co. as vice president and sales manager. He has also been affiliated with E. B. Wiggins Oil Tool Co., and management positions with Byron Jackson, Harvey Machine Co., and Power Rig & Equipment Co.

Borchers Named Bristol General Sales Manager

F. W. Borchers has been appointed general sales manager of The Bristol Co., Waterbury, Conn., manufacturers of automatic controlling, recording, telemetering, and aircraft instruments, according to an announcement by Harry E. Beane, vice president of sales.

Borchers joined Bristol sales engineering organization in 1922, and in 1933 was appointed district manager of the company's Birmingham office. In 1935 he became district manager of the Philadelphia office, and in 1946 district manager of the New York office. In 1948 he was appointed assistant sales manager.

Borchers will maintain his headquarters at the company's main office at Waterbury, Conn.

Mid-Continent Opens New Canadian Store

Mid-Continent Supply Co.'s new store in Edmonton, Alta., Canada, is now in operation, President Ken W. Davis announced recently from the Fort Worth headquarters of the organization. At the same time Davis announced the promotion of C. W. Crabtree to Edmonton district manager.

Edmonton is one of two Mid-Continent locations in Canada. A division office is maintained in Calgary under the direction of division manager R. L. Harris and division machinery manager G. A. Metz.

C. W. CRABTREE

W. SABO

Wellington Sabo is Edmonton store manager. Field salesmen are W. B. Cruse and F. M. Wilson. Other personnel include J. L. Kenny, D. F. Law, D. E. Ostrosser, H. L. Ruffin, and R. C. Waller.

W. B. CRUSE

F. M. WILSON

Store Manager Sabo had 4 years' experience with another supply company in Calgary before coming with Mid-Continent. Cruse and Wilson were transferred from Mid-Continent locations in Sterling and in Elk City, Okla. Ruffin transferred to Edmonton from the Fort Worth general offices of the company.

Mercier, Brammer Join Western Co. Sales Staff

V. J. (Mike) Mercier and R. N. (Dick) Brammer have joined the sales staff of The Western Co., Midland, Tex., it has been announced by John Ed Cooper, Western's general sales manager.

V. J. MERCIER

R. N. BRAMMER

Mercier has been assigned to the Odessa, Tex., area as a field salesman and will handle sales of both pumping and wire line service for Western. He is an electrical engineering graduate of University of Missouri and has had 15 years' experience in radioactivity well logging, perforating, and seismograph survey work.

Brammer, a petroleum-engineering graduate of University of Oklahoma, has had several years' experience in the oil and gas fields of western Kansas and Oklahoma Panhandle.

In his new assignment Brammer will represent Western in the sale of the company's acidizing and fracturing services in the Borger area.

Honeywell Appoints Kaiser Sales Head in Eastern Area

The appointment of Fred Kaiser as manager of the eastern region of Minneapolis-Honeywell Regulator Co., with headquarters in New York, was announced recently by Tom McDonald, vice president in charge of sales. The eastern region covers New York, New Jersey, Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, and Maine.

Since 1949 Kaiser has been field sales manager for the company, working out of the executive offices in Minneapolis. He joined Honeywell in 1926 as service and sales representative in the New York office. He served as branch manager in the Syracuse, Buffalo, and Detroit offices, and in 1944 became regional manager, with headquarters in Chicago, which position he

held until his appointment as field sales manager in 1949.

Arnold Michelson, who has been handling the regional manager's duties, has been given additional duties and responsibilities as resident vice president. He will continue to make his headquarters in New York.

G. E. Announces New Slidefilm of Gas Turbines

The availability of a new sound-color slide film on the uses, advantages, and manufacture of the gas turbines for gas pipe-line pumping has been announced by General Electric Co.

The 12-minute slide film, called "The El Paso Story," gives a colorful presentation of the application of the G-E. gas turbine to the long-distance transmission of natural gas.

The film centers around the Cornudas, Tex., compressor station of El Paso Natural Gas Co.'s southern main line where the first of twenty-eight 5,700-hp. G-E. gas turbines for the El Paso gas-transmission system between West Texas and California was placed in operation.

Six major advantages of installing gas turbines in compressor stations instead of the customary reciprocating engines are pointed up in the 85 frames of the film.

Vernon Tool to Manufacture, Sell Greenwood Valves

W. W. Blackburn, president, Vernon Tool Co., Ltd.; D. H. Greenwood, and John Walker, Vernon sales engineer, discuss plans as Vernon Tool Co., Ltd., becomes exclusive licensee for the manufacture and sale of Greenwood valves.

Vernon Tool Co., Ltd., Alhambra, Calif., and D. H. Greenwood, well-known valve engineer, have recently completed a contract whereby Vernon Tool Co., Ltd., becomes the exclusive licensee for the manufacture and sale of Greenwood valves.

The Greenwood line, including the triple-action quick-closing safety valve, the unitized bypass check valve, and the newly introduced gate-valve line blind, will be operated as The Greenwood Valve Division of Vernon Tool Co., Ltd.

John Walker, valve sales engineer, is being transferred to the Houston offices of the company to assist in introducing the line of Greenwood valves in the Mid-Continent and Gulf Coast areas.

Turner Is Named General Counsel for National Tank

DON TURNER

Don Turner, former attorney for Sohio Petroleum Co. in St. Louis, has joined National Tank Co., Tulsa, as its general counsel and administrative assistant, according to Jay P. Walker, president.

Turner, a graduate of University of Illinois and of St. Louis University, recently resigned as executive vice president of Rinehart Oil News at Dallas.

After his graduation from St. Louis

HONAN-CRANE OIL PURIFIERS

*the choice of Leading Oil Companies**

Honan-Crane Purifiers service 7 880-H.P. gas booster engines at Continental Oil's Sussex plant in Johnson County, Wyo.

The petroleum industry recognizes, better than any other, the importance of clean oil as a factor in equipment maintenance. It is significant, therefore, that leaders in this field choose Honan-Crane Oil Purifiers to protect their own equipment against faulty lubrication and costly damage. Honan-Crane's on-the-job performance on every type of engine—turbine, diesel, gas, gasoline—has proven to these companies that the *best* saves them *most* in the long run.

There's a Honan-Crane Fuel or Lube Oil Purifier for almost every size engine. Write for complete information about your oil purification problem.

*** These major oil companies use Honan-Crane Purifiers on their own engines:**

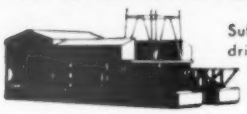
Cities Service Refining Corp.
Continental Oil Company
Gulf Refining Company
Magnolia Pipe Line Company
Phillips Petroleum Corp.
The Pure Oil Company
Sinclair Refining Company
Socony-Vacuum Oil Company
Standard Oil Co. of Ohio
Texas Pipe Line Company
The Texas Company

WORLD LEADING OIL FILTER MANUFACTURER

HONAN-CRANE CORPORATION
822 WABASH AVENUE • LEBANON, INDIANA
a subsidiary of
HOUDAILLE-HERSHEY CORP.

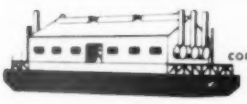
Levingston

BUILDS FINE SPECIALIZED MARINE EQUIPMENT FOR THE PETROLEUM INDUSTRY



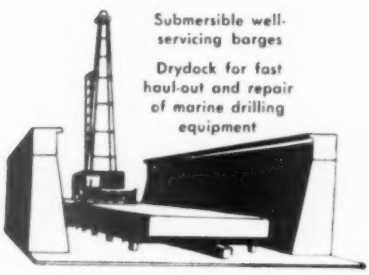
Submersible drilling barges

Tugs



Boiler and compressor barges

Water, oil, and supply barges



Submersible well-servicing barges

Drydock for fast haul-out and repair of marine drilling equipment

Levingston is not only located conveniently with respect to marine drilling operations on the Gulf Coast, but here you will find marine engineers and constructors who understand the language of oil operators. Bring your marine petroleum equipment problems to Levingston *first* for a quick economical solution.

Levingston

SHIPBUILDING CO.

Orange, Texas

Another T·T·L· Service!

OUR NEW GEOLOGICAL DEPARTMENT

- SAMPLE WELL LOG without POROSITY GRAPH
- SAMPLE WELL LOG with POROSITY GRAPH
- LITHOLOGIC REPORT of the SAMPLE WELL LOG
- WELL SITTING
- ELECTRIC WELL LOGGING INTERPRETATION and CORRELATION
- SEISMOGRAPH RECORD INTERPRETATION and CORRELATION
- GEOLOGICAL DRAFTING

KNOW BY TEST

"A hair perhaps divides the false and true" — Omar

The addition of a Geological Department gives us at T. T. L., another facility for serving the Oil Industry. Our staff, equipment and twenty years of experience are at your command, whether your problem is a one-time project or long-range continuing tests. We invite your inquiries.

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For Safety Unsurpassed

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Safety SPINNING LINE and BREAKOUT CATHEADS

The Model 16-LH Non-Fouling Cathead

THE OUTSTANDING CATHEAD OF TODAY AND TOMORROW

Anti-Fouling Catline Spool
Completely Housed Friction Cathead
Simplicity of Design, Operation and Maintenance
Double-Plate Clutch
Anti-Friction Bearings Throughout as Recommended by Leading Bearing Manufacturers
Choice of Mechanical, Hydraulic or Air Controls

AVAILABLE THROUGH YOUR FAVORITE SUPPLY STORE

Representatives in All Fields

Be Safety Wise — KelCo-ize

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TULSA, OKLAHOMA

SPINNING LINE CATHEADS • BREAKOUT CATHEADS • AIR OPERATED POWER SLIPS
TUBING TONGS • SAFETY "C" POLISHED ROD CLAMPS

a life saver

Thousands and thousands of "drowning" wells have literally been "saved" by the BAKER Model "K" CEMENT RETAINER, Product No. 400. It is so successful for special and remedial cementing that experienced oil operators in every field in the world use it as "standard equipment." Here are some of the applications where the Baker Cement Retainer can prove to be a "life saver" for you . . . Squeeze Jobs • Recementing • Reducing Gas/Oil Ratios • Cementing Behind Sections of Pipe • Plugging Off Bottom Fluids • Testing Upper Cased Formations • Plugging Back to Upper Zones • Cementing Off to Perforate for Production • Cementing Bad Pipe • Used as a Casing Bridge Plug, with cast iron construction for *permanent* installations, and of magnesium alloy for *temporary* use. For complete details see your BAKER (or Composite CATALOG, or write to Baker Oil Tools, Inc., Houston, Los Angeles, or New York.

BAKER CEMENT RETAINER • *Product No. 400*

Power TO FIT THE JOB

Power TO FIT THE MACHINE

WISCONSIN-POWERED STEAM GENERATOR

Generating steam is an important operation, handled here by a Tex-Steamer, built by Texsteam Corp., Houston, Tex., Div. Vapor Heating Corp. A Wisconsin Heavy-Duty Air-Cooled Engine provides power for this "Steamer", the applications of which are increasing at a rapid rate throughout all oil fields.

In the petroleum industry Wisconsin Heavy-Duty Air-Cooled Engines are *used most* for good reason. They offer you more than rugged construction features. For example, you select the *right* size Wisconsin because of the wide model range . . . single-cylinder, 2-cylinder or V-type 4-cylinder models, 3 to 36 hp. Because the engine is right for the job, it delivers better lugging power due to best relationship of horsepower to torque, for the most dependable day in and day out performance.

WISCONSIN MOTOR Corporation
MILWAUKEE 46, WISCONSIN
World's Largest Builders of Heavy-Duty Air-Cooled Engines

WRITE TO HARLEY SALES CO.
619 S. MAIN STREET, TULSA, OKLAHOMA
M & M BUILDING, HOUSTON, TEXAS
505 SOUTH MAIN ST., WICHITA, KANSAS
OIL FIELD DISTRIBUTORS FOR WISCONSIN ENGINES AND ALL TYPES OF UTILITY UNITS.

A 7546-1/30

University Law School in 1935, Turner practiced law in the oil fields of Illinois, Indiana, and Kentucky with offices at Mt. Vernon, Ill. In June of 1941 Turner joined Sohio at Mt. Vernon to organize its legal and title department. In 1945 Turner was made administrative assistant and legal advisor to J. Frank Wilson, Sohio's vice president in charge of pipe line and crude-oil purchasing. He resigned to go with Rinehart in 1950.

Kelley Manufacturing Names King to West Texas Sales

CARL L. KING

Carl L. King has joined Kelley Manufacturing Co. as salesman in the West Texas territory. James S. Whitcomb, executive vice president of Kelley, has announced. His headquarters will be in Abilene.

King was formerly associated with Dunham Wilson Co. He attended Texas A. & M. College.

Kelley Manufacturing is one of the largest wholesale distributors of steel products and manufacturer of metal stampings for industrial use.

Graver Installs Water Plant at Bayway

The world's largest hot-process hot-zeolite water softener, installed at the Bayway refinery of Esso Standard Oil Co., was designed and built by Graver Water Conditioning Co. It handles 200,000 gal. per hour of feed water for 650-psi. boilers. It is known as the "Sphericone" because its shape combines a sphere and cone, and is 60 ft. high and 43½ ft. in diameter. Its special shape provides distinctive advantages in obtaining clearer and softer water.

Edwards Named Divisional Head by Harnischfeger

F. C. EDWARDS

An announcement has been made by Henry Harnischfeger, executive vice president of Harnischfeger Corp. regarding the appointment of Frank C. Edwards as general manager of the P. & H. diesel engine division in Crystal Lake, Ill.

Edwards has served the company in a number of different capacities since he first began his employment in the company's Milwaukee shops in 1925. Since that time, he has been affiliated with various of Harnischfeger's district offices, among which were those in Memphis, New York, Jacksonville, and Pittsburgh. He also was general manager of the company's former truck-crane plant in Newark. For the past 4 years, he has held the position of sales manager of P. & H.'s small excavator division.

Merla Tool Names Shireman Assistant Sales Manager

Merla Tool Corp., gas-lift-equipment manufacturer, has announced the appointment of Howard C. Shireman as assistant sales manager. Shireman will work out of the Dallas headquarters. Shireman has been active in oil-field-equipment sales for 19 years, and was previously division engineer for National Supply Co.; district manager for Welex Jet Services, and division engineer for Dia-Log Co. in charge of the West Texas area.

Norton Appointed Oteco Products Representative

Otis W. Sanders, president of Oteco Equipment Co., Houston, recently announced the appointment of J. I. Earl Norton of Jahn-Lamkin Co. as a representative of Oteco products in the district which includes Shreveport, East Texas, Northern Louisiana, Northern Mississippi, and Southern Arkansas. The firm has also appointed Ray Arnold, of Manufacturers' Distributors, as the exclusive distributor for all Oteco products in Great Bend, Kans.

FIRE-PROOF!
— Meets New "Petroleum Safety Order" Requirements

BARCO
All-Steel
Ball Joints

For Blow-Out Preventer Service

HERE are the Barco Flexible Ball Joints for piping connections to blow-out preventers and other drilling equipment that meet ALL SAFETY REQUIREMENTS. These are 1" SERIES 600 steel joints shown here on a drilling rig in the Bakersfield area of California.

PRESSURE SAFE, FIREPROOF! These joints eliminate the need for hose. They are recommended for hydraulic test pressures up to 7,500 psi. They are equipped with Barco Service No. 11MA metal gaskets. Joints contain no combustible material.

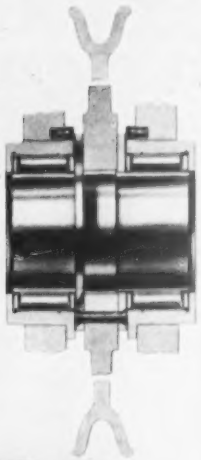
3 JOINTS DO WORK OF 5! Barco Ball Joints move *in any direction* permitting a 40% reduction in number of joints required. Barco SERIES 600 joints are available in a wide variety of sizes and styles. For test pressures up to 11,000 psi, order SERIES 2500 joints. *Available through your local supply store.*

Ask for Catalog 215:

BARCO
MANUFACTURING CO.,
539K Hough Street
Barrington, Illinois

The Only Truly Complete Line of Flexible Ball, Swivel, Swing, and Revolving Joints

STANDARD
OF THE
PETROLEUM INDUSTRY
Since 1905



Regan *time proven*
DUAL BEARINGS

. . . for greater bearing life and longer wire line life. With Regan exclusive, rotating inner race Dual Bearings, each sheave has an integral rotating pin which distributes bearing wear around the entire area of the pin. Bearings on *each side* of the rotating pin prevent oscillation of the sheave. This construction permits use of smaller bearings which enables the block to operate at greater speed with less friction and minimum wire line slippage. Exclusive Regan long-lived Dual Bearings are embodied in all Regan Crown and Traveling Blocks.

Write for detailed information.

50

Regan
Forge & Engineering Co.
SAN PEDRO, CALIF.
FORT WORTH, TEXAS
Exclusive Mid-Continent and Export Distributor:
MID-CONTINENT SUPPLY CO.
General Offices: Fort Worth, Texas
Quality - Wrought on the Forge of Experience

Pipe-Line Construction

PIPE-LINE activity as reported below by The Oil and Gas Journal is compiled from information received from pipe-line companies and contracting firms.

These projects include those planned, proposed, under way, and contracted. Uncontracted projects are indicated by a • preceding the company name.

Crude-Oil Pipe Lines

• **California - Oregon Pipe Line System**—103 miles 6-in., proposed, Crescent City, Calif., to Medford, Ore.

• **R. A. Goodall.**—45 miles, 6-in., planned, Little Beaver to Merino, Colo. (To connect with Sterling system).

• **Gulf Refining Co.**—55 miles, 12-in., planned. Bay Marchand to Plaquemines, La.

Gulf Refining Co.—63 miles, 8-10-in., under way, Lea County, New Mexico, to Anderson and Denton fields. 1-54.

Humble Pipe Line Co.—71 miles, 16-18-in., under way, East Texas to Louisiana - Texas border. (30 miles of 16-in., and 41 miles of 18-in.) O. R. Burden Const. Corp. Completion date 10-53.

40 miles, 18-in., under way Longview to Louisiana border. Panama Williams.

Interstate Oil Pipe Line Co.—107 miles, 22-in., under way, Shreveport to Baton Rouge, La. River Construction Corp. 10-15.

55 miles, 16-in., under way, Raceland to Anchorage, La. L. E. Farley.

Plaquemine to Anchorage, La.

Lakehead Pipe Line Co.—635 miles, 30-in., under way, Superior, Wis., to Sarnia, Ontario, Canada. Project managed by Bechtel Corp., Saginaw, Mich.

Superior to Wisconsin-Michigan state line. Mahoney Contr.

Cooks to St. Ignace, Mich., on Straits of Mackinac. Midwestern Constructors, Inc.

Mackinaw City to Red Oak, Mich. Bechtel Corp.

Red Oak via Bay City to International Boundary south of Port Huron on St. Clair River. Conyes Const.

Water crossings of Mackinaw, Saginaw, and St. Clair rivers, Merritt-Chapman & Scott Corp., W. J. Meagher & Sons, Inc., and Midwestern Constructors.

• **Magnolia Pipe Line Co.**—29 miles, 8-in., planned. Midland County, Texas area.

Magnolia Pipe Line Co.—154 miles 16-in., under way, Corsicana to Ringgold, Tex. H. B. Zachry.

Michi, Inc.—10-in., planned, Highland, Ind. to Kalamazoo, Alma, and Elsie, Mich.

• **Pasotex Pipe Line Co.**—146 miles, 10-in., planned. Snyder to Wink, Tex. 2-1-54.

Phillips Pipe Line Co.—18 miles, under way, gathering lines, northeast area of Andrews County, Texas.

• **Progress Pacific Pipeline Co.**—1,100 miles, 24-in., planned, Odessa, Tex., to Los Angeles, Harbor, Calif.

• **Roosevelt Oil & Refining Corp.**—22 miles, 4 and 6-in., planned St. Helen to Norwich, Mich.

Service Pipe Line Co.—153 miles, 12-16-in., under way, Tioga-Beaver Lodge area to Mandan, N. D. O. R. Burden Const. Corp. 11-15-53.

55 miles, 4-6-8-in., under way, Tioga-Beaver Lodge area gathering system. C. P. Bartley & Son.

Sinclair Pipe Line Co.—45 miles, 18-in., under way, Cushing to Shawnee, Okla. O. R. Burden Const. Corp. 11-1-53.

Texas New Mexico Pipe Line Co.—52 miles, 10-in., contracted, Dawson County to Basin System, McVean & Barlow.

Texas Pipe Line Co.—34 miles, 6-in., under way, Sour Lake to Port Arthur, Tex. Houston Contracting.

45 miles, 8-10-in., under way, between Erath and Bayou Sale stations. Houston Contracting Co.

• **West Coast Pipeline Co.**—960 miles, 20-22-in., planned, Wink, Tex., to Norwalk, Calif.

Products Pipe Lines

Augusta Pipe Line Co.—43 miles, 8-in., under way, from Arkansas City to Augusta, Kans. Ray L. Smith & Son, Inc.

Badger Pipe Line Co.—215 miles, 8-10-12-in., begin Spring '54, East Chicago, Ind., to Madison, Wis. (Joint project of Cities Service Oil Co., Sinclair Pipe Line Co., Pure Oil Co., and The Texas Co.

• **H. W. Bass & Sons, Inc.**—152 miles, 4-6-in., proposed. Duval and Live Oak counties, Texas, to Corpus Christi, Tex.

Evangeline Products System (Texas Pipeline Co., Gulf Refining Co., Sinclair Pipe Line Co.)—196 miles, 16-in., under way, Port Arthur, Tex., to Baton Rouge, La. Panama-Williams Corp. (line and crossings.) J. Ray McDermott Co., Inc., collaborates in crossings.

• **Great Lakes Pipe Line Co.**—Proposed, extension 130 miles, Nebraska City to Grand Island, Neb.

Harbor Products Systems—86 miles, 16-in., under way, Woodbury Junction, Philadelphia to Trembley Point, N. J. Construction Service Co. and H. C. Price Co. (Joint ownership of Sinclair Pipe Line Co., Gulf Refining Co., and Texas Pipe Line Co.)

Kaneb Pipe Line Co.—246 miles, 8 and 10-in., under way, Wichita, Kans., to Fairmont, Neb. Ray L. Smith & Son, Inc.

• **Phillips Petroleum Co.**—54 miles, 6-in., planned, Goldsmith to Borger, Tex.

45 miles, 10-in., under way, Harrisonville, Mo. Mid States.

52 miles, 10-in., planned, Shell's Brookshire system to Sweeny, Tex.

Plantation Pipe Line Co.—82 miles, 14-in., under way, Charlotte to Greensboro, N. C. Anderson Bros. 11-10-53.

• **Salt Lake Pipe Line Co.**—40 miles, 6-in., under way, Adams, Ore., to Pasco, Wash. Engineers, Ltd., P. L. Co.

Standard Oil Co. (Ind.)—243 miles, 10-12 in., under way, Whiting, Ind. to River Rouge, Mich.

Calumet district, Indiana, Morrison Construction Co.

Lake County, Indiana boundary to Colon, Mich., Somerville Construction Co.

Colon to Romulus, Mich. R. B. Potashnick.

Romulus to River Rouge, Mich. R. L. Coolsaet Construction Co.

207 miles, 8-in., under way, Mandan, N. D. to Moorhead, Minn. Associated Pipe Line Contrs. 12-53

Sunray Oil Corp.—440 miles, 10-in., contracted, Duncan, Okla., to Mississippi River. Ford, Bacon & Davis.

Sun Pipe Line Co.—50 miles, 8-in., under way, Toledo, Ohio to Inkster Junction west of Detroit. 10-53. R. L. Coolsaet Const. Co. and Poston Pipe Line Co.

• **Triangle Pipe Line Co.**—560 miles, proposed, Arkansas City, Ark., to Covington, Ky., and Nashville, Tenn.

• **United States Pipe Line Co.**—1,799 miles, 22-26-in., proposed, Beaumont, Tex., to Newark, N. J.

Beaumont, Tex., to Memphis, Tenn.
Memphis, Tenn., to Louisville, Ky.
Louisville, Ky., to Newark, N. J.
Laterals to Paducah and Lexington, Ky.

• **Williston Basin Pipe Line Co.**—244 miles, 8-in., proposed, Laurel-Billings, Mont., refineries to Glendive, Mont.

Wolverine Pipe Line System—200 miles, 14-in., under way, Chicago-Toledo-Detroit. (Joint ownership of Shell, Texas, and Cities Service.) Anderson Bros. and Midwestern Constructors, Inc. Completion date 1-54.

East Chicago, Ind. to Kalamazoo River, Midwestern Constructors, Inc.

Yellowstone Pipe Line Co.—(Continental Oil Co., Interstate Oil Pipe Line Co., Union Oil Co., and H. Earl Clack interest) 540 miles, 10-in., planned, Billings, Mont., to Spokane, Wash. 9-54.

Natural-Gas Pipe Lines

• **America-Louisiana Pipe Line Co.**—1,000 miles, 30-in., proposed, Lowry, La., to Detroit, Mich.

• **Arkansas-Missouri Power Co.** — 140 miles, 2 to 10-in., planned, St. Francis River, Clay County, Arkansas, to near Campbell, Mo.

• **Associated Natural Gas Co.**—88 miles, proposed, Missouri.

• **Atlantic Seaboard Corp.**—29 miles, 26-in., proposed, looping along Cobb-Rockville, Md., line.

Buzzards Bay Gas Co.—28 miles, 8-in., contracted, Hyannis, Mass., to Bourne Bridge, Mass. Hallen Co., Inc.

• **Carolina Natural Gas Corp.**—185 miles, 2-12-in., proposed, lateral lines off Transcontinental in North and South Carolina.

• **Chattahoochee Natural Gas Co.**—70 miles, proposed, Floyd County, Georgia to Dalton, Ga.

• **Chicago District Pipe Line Co.**—31 miles, 24-30-in., proposed, East bank of Des Plaines River southwesterly to near Hodgkins, Ill., on through Cook County to Will County, Illinois.

• **Cities Service Gas Co.**—18 miles, 16-in., Lawrence and Newton counties, Missouri.

69 miles, 20-16-in., proposed, Cleveland, McClain, and Garvin counties, Oklahoma.

• **City of Fayette, Ala.**—20 miles, 5-in., proposed, Fayette, Ala., to Southern Natural's system in Tuscaloosa County, Ala.

City of Dallas, Ga.—8 and 4½-in., distribution system. Engineering & Const. Co., 1954.

• **Coast Counties Gas & Electric Co.**—40 miles, 3, 4, and 8-in., planned. Coast and Valley region, California.

• **Colorado Interstate Gas Co.**—365 miles, 22-in., proposed, Green River, Wyo., to Denver, Colo. 1954.

243 miles, 4 to 20-in., planned, Colorado, Oklahoma, Texas, and Kansas.

50 miles, 20-in., under way, Hugo to Eads, Colo. R. H. Fulton.

Colorado Interstate Gas Co. — 70 miles, 20-4-in., under way, gas-gathering system in Kansas. Engineering & Const. Co. 1-1-54.

• **Cumberland and Allegheny Gas Co.**—31 miles, 12-in., proposed, Garrett County, Md., to Keyser, W. Va.

East Tennessee Natural Gas Co.—96 miles, 16-in., under way, Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

54 miles, 4-12-in., under way, laterals off main line from Knoxville, Tenn., to Kent line. Engineering & Const. Co. 1-1-54.

• **El Paso Natural Gas Co.**—1,178 miles, proposed, Permian basin, New Mexico, Texas and Colorado.

El Paso Natural Gas Co.—771 miles, 30-in., under way, Plains, Tex. to Kingman, Ariz. 567 miles contracted by Oklahoma Pipe Line Constructors, R. H. Fulton and Co. and Western Pipe Line Contractors. 204 miles to be built by El Paso Natural construction organization.

Under way, Flagstaff to Kingman, Ariz., Western Pipe Line Const., Inc. 2-54.

Under way, Denver City, to Corona, N. M. Okla. Pipe Line Constructors, Inc. 12-15-53.

• **Fort Worth Basin Gas Co.**—Planned, Novice, through Brown and Comanche counties, Texas.

• **Glacier Gas Co.**—285 miles, 20-in., proposed, Kalispell, Mont., to Spokane, Wash.

120 miles, 16-in., proposed, Spokane to Hanford, Wash.

91 miles, 8⅝-in., proposed, Spokane to Lewiston, Idaho.

130 miles, 12¾-in., proposed, Spokane to International boundary at Trail, British Columbia.

Gulf Interstate Gas Co.—860 miles, 30-in., under way. Acadia Parish, La., to Boyd County, Ky. H. C. Price and Houston Contracting. 11-54.

Under way, Rayne, La. to Kincade, Tenn. Houston Contr.

Under way, Gordonsburg, Tenn., to Cattettsburg, Ky. H. C. Price Co.

230 miles, gathering lines, under way. Associated Pipe Line Contractors, Anderson Bros., Williams Bros.

329 miles, 12 to 24-in., proposed. Laterals off Acadia Parish, Louisiana, to Boyd County, Kentucky, line.

• **Home Gas Co.**—32 miles, 12-in., planned, Breesport to Union Center, N. Y.

17 miles, 12-in., proposed, loops from Hansock to Sanford, N. M.

Home Gas Co.—46 miles, 12-in., under way, Tioga and Broome counties, New York. H. L. Gentry Const.

22 miles, 12-16-in., under way, Binghampton, N. Y.

• **Interstate Power Co.**—26 miles, 8-in.,

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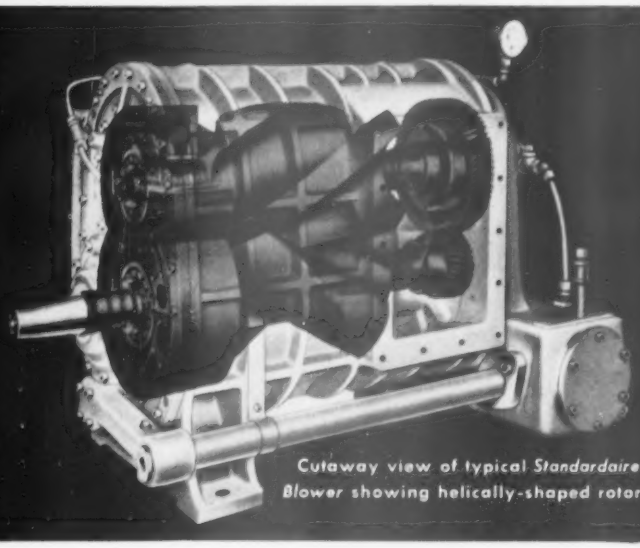

Cutaway view of typical *Standardaire Blower* showing helically-shaped rotors.

As the *Standardaire Blower's* unique helically-shaped rotors revolve, pockets are formed at the intake port which diminish in size as they approach the point of discharge. Within these pockets, air is compressed gradually and smoothly. The internal pressure is raised approximately to the discharge pressure before the pocket registers with the discharge port . . . reducing noise, shock, and loading of internal parts.

Since high pressure air is confined to the discharge end of the *Standardaire Blower*, leakage lines are much shorter than on other types of units. The rotors are accurately machined to very close running clearances and provide a continuous sealing for the entire length of their engagement. Their perimetral edges are sealed by the housing.

These are but a few of the unique features of *Standardaire Blowers* . . . which result in very high volumetric efficiency at lower installed cost, and lower maintenance and operating costs.

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proposed, from Nat. Gas P. L. Co. America line near Hooppole, Ill., to Clinton, Ia.

Iowa-Illinois Gas & Electric Co.—41 miles, 10-in., under way, Washington County to Cedar Rapids, Iowa.

• **Kansas-Nebraska Natural Gas Co.**—41 miles, 10-12-in., proposed, Kansas and Nebraska.

Kansas-Nebraska Natural Gas Co., Inc.—41 miles, proposed, Albion, Arcadia, and Broken Bow, Neb.

• **Lone Star Gas Co.**—100 miles, proposed, storage fields to the Dallas-Fort Worth area.

35 miles, 12-in., proposed, southeastern Schleicher County.

36 miles, 12-in., planned, Stamford to Abilene, Tex.

Lone Star Gas Co.—44 miles, 12-in., under way, Red Springs, Woods County to Sulphur Springs area, Hopkins County, Texas.

• **Manufacturers Gas Light & Heat Co.**—40 miles, proposed, Allegheny, Washington, and Beaver counties, Pennsylvania.

213 miles, 3 to 26-in., proposed, various points on system in Pennsylvania, West Virginia, and Ohio.

72 miles, 16-20-in., proposed, Doddridge, Wetzel and Marshall counties, West Virginia.

Michigan Consolidated Gas Co.—30 miles, 12-20-24-in., under way, gas gathering system in Six Lakes field. Somerville Const. Co. 11-1-53.

• **Mississippi River Fuel Corp.**—109 miles, 10-18-in., planned, laterals in Woodlawn and Waskom gas fields, Texas.

Missouri Central Gas Co.—25 miles, 6-in., contracted, Moberly to Macon, Mo. L. R. Young Const. Co.

• **Missouri Public Service Co.**—136 miles, 8-10-in., proposed, New Franklin to Trenton, Mo.

24 miles, 10-in., Johnson County to Clinton, Mo.

• **Montana Power Co.**—52 miles, 16-in., planned, Canada - Montana border to Cut Bank, Mont.

• **Morganfield Natural Gas Co.**—31 miles, 4-6-in., planned, through Sturgis, Providence, Clay, Diamond, Wheatcroft, and Sullivan, Ky.

• **Natural Gas Producer Inc.**—100 miles, 12-in., planned, Yenter pool to Denver, Colo.

• **Nevada Natural Gas Pipe Line Co.**—114 miles, 12¾-in., proposed, Topock, Ariz., to Las Vegas, Nev.

• **New River Gas Co.**—50 miles, planned, Summers to Monroe counties, West Virginia, to Narrows and Dublin, W. Va.

• **New York State Electric and Gas Co.**—59 miles, 8-10-24-in., proposed, Oneonta and Norwich to DeRuyter, N. Y.

• **Northern Indiana Fuel & Light Co.**—35 miles, 8-in., proposed, Edgerton to Auburn, Ind.

• **Northern Natural Gas Co.**—458 miles, proposed, Kansas, Texas, Oklahoma, and Nebraska, Iowa and Minnesota to connect with Permian Basin System.

475 miles, proposed branch lines to Iowa, Nebraska, Minnesota and South Dakota.

Northern Natural Gas Co.—Section No. 1, 92 miles, 30-in., under way, Dumas via Sunray to main line north of Canadian River, Texas, and two loops near Beaver station, Oklahoma, R. H. Fulton & Co.

Northern Natural Gas Co.—Section 2, 70 miles, 30-in., contracted, loops near Mullinville, Bushton and Clifton stations, Kans., and Palmyra station, Neb. Lone Star Constructors.

Northern Natural Gas Co.—Section 3, 94 miles, 24-in., and 30-in., contracted loops near Paulina, Ogden, and Oakland stations, Iowa, G. G. Griffis Construction Co.

• **Northwest Alabama Gas District**—40 miles, 9-in., proposed, Southern Natural's line through Winfield to Haleyville, Ala.

• **Northwest Natural Gas Co.**—750 miles, planned, Washington, Oregon, and Idaho.

24-in., Eastport, Idaho, to Monroe, Wash.

18-in., Monroe to International boundary near Lynden, Wash.

22-in., Monroe to near Seattle, Wash.

20-in., Seattle to Portland, Ore.

• **Ohio Fuel Gas Co.**—31 miles, 20-in., planned, Licking County to Richland County, Ohio.

22 miles, 16-in., planned, Dayton, Troy, Piqua, and Sidney, Ohio.

23 miles, 16-20-in., planned, Wellington to Elyria, Ohio; 16 miles, 20-in., planned, Benton Station to Crawford Station; 18 miles, 20-in., Crawford Station to near Columbus; 16 miles, 16-in., planned, Berlin to Sandusky, Ohio.

74 miles, 3 to 20-in., planned, Hocking, Knox, and Ashland counties, Ohio.

47 miles, 20-in., planned, Benton Township, Hocking County, to Columbus, Ohio.

61 miles, planned, northern and southwestern Ohio.

33 miles, 20-in., proposed, Jefferson to Seneca, Ohio.

69 miles, 20-24-in., proposed, lines to tiein Gulf Interstate line along various points in Lawrence, Jackson, Vinton, Hocking and Fairfield counties, Ohio.

• **Pacific Gas & Electric Co.**—50 miles, 12-16-20-in., planned, Fresno to Merced, Calif.

(Section 2) 20-in., Holm to Topock-Milpitas line.

(Section 3) 12-in., parallel existing Madera-Livingston line, planned. Napa Wye to Shellville; Cotati to Santa Rosa, Calif.

170 miles, 34-in., proposed, main-line loops along Topock, Ariz., to Milpitas, Calif.

• **Pacific Northwest Pipeline Corp.**—1,466 miles, proposed, Ignacio, Colo., to Bellingham, Wash.

380 miles, proposed, laterals and spurs off main line to Pocatello, Idaho, to Yakima, Wash.

Permian Basin Pipeline Co.—280 miles, 16-24-26-30-in., under way, West Texas and New Mexico. R. H. Fulton & Co.

• **Rockland Light & Power Co.**—22 miles, 8-in., proposed, Orangetown to Tompkins Cove, N. Y.

• **Shenandoah Gas Co.**—39 miles, 3-4-8-in., proposed, Middleton, Va., to Martinsburg, W. Va.

South Carolina Gas & Electric Co.—160 miles, 16-12-10-in., contracted, Aiken, S. C., to cities of Columbia, Summerville, and Charleston, S. C. Williams Bros. Completion date 1-54.

• **South Georgia Natural Gas Co.**—339 miles, 2-12-in., planned, Phoenix, Ala., to Tallahassee, Fla. (a) 12-in., Phoenix, Ala., to Albany, Ga., (b) 10-in., Albany, Ga., to Moultrie, Ga., (c) 8-in., Moultrie, Ga., to Tallahassee.

Southern California Gas Co., and Southern Counties Gas Co.—73 miles, 30-in., under way, loops on main line from Blythe to Los Angeles. River Const. Co. 1-54.

Southern Counties Gas Co.—15 miles, 24-in., under way, Brea to Santa Ana, Calif. Hood Const. Co. 11-15-53.

Southern Natural Gas Co.—1,235 miles, 24 to 4½-in., under way, Louisiana, Mississippi, Alabama, and Georgia, and South Carolina. Houston Contracting, Latex and H. C. Price. Fall 1953.

• **Southwest Gas Corp., Ltd.**—26 miles, proposed, from P.G.&E. line to Victorville, Calif.

Tennessee Gas Transmission Co.—571 miles, 30-in., planned, Kinder, La., to Portland, Tenn.

67 miles, 30-in., planned, loops in Texas and Louisiana.

63 miles, 26-in., planned, loops in Ohio and Pennsylvania.

58 miles, 20-in., planned, Louisiana Gulf Coast to Station No. 507 near Kinder, La.

100 miles, laterals in Texas.

45 miles, 20-in., proposed, Buffalo, N. Y.,

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to the U. S.-Canadian border Hamburg station near St. Catherines.

Texas-Illinois Natural Gas Pipe Line Co.—65 miles, various, under way, vicinity of Victoria and Houston, Tex. O. R. Burden Const. Co. 11-10-53.

• **Texas-Ohio Gas Co.**—1,435 miles, 30-in., proposed, Hidalgo County, Texas, through Arkansas, Mississippi, Tennessee, and Kentucky on to Spencer, W. Va.

• **Trans-Northwest Gas, Inc.**—246 miles, proposed, International Boundary near Osoyoos, B. C., to Washington and Idaho.

275 miles, branch lines.

• **United Gas Fuel Co., and Central Kentucky Natural Gas Co.**—92 miles proposed, Gulf Interstate system, Boyd County, Ky., to Putnam County, West Virginia.

• **United Fuel Gas Co.**—50 miles, 20-24-in., proposed, Wood County to Lanham, W. Va. Spring 1954.

32 miles, 24-in., proposed, near Ripley, W. Va., to Lanham station, Putnam County, W. Va.

60 miles, 30-in., proposed, Lanham in Kanawha County, West Virginia, to Gulf Interstate line in Boyd County, Ky.

• **United Gas Pipe Line Co.**—44 miles, 20-in., planned, Lirette field to Harvey, La.

• **United Natural Gas Co.**—50 miles, 12-in., planned, Elk County to Jefferson County, Pennsylvania.

• **Utah Natural Gas Co.**—103 miles, 16-18-in., proposed, Clear Creek field near Price to Salt Lake City, Utah.

18-in., Clear Creek to Provo, Utah.

16-in., Provo to Salt Lake City, Utah.

Virginia Natural Gas Co.—153 miles, Buckingham to Richmond and Portsmouth, Va.

Westcoast Transmission Co., Ltd.—(See foreign natural gas pipe lines).

Foreign Crude-Oil Pipe Lines

Basrah Petroleum Co.—65 miles, 24-in., under way, Zubair to Fao, Iraq. Completion date 10-53.

Bombay Port Trust.—50 miles, 8 to 24-in., contracted, Bombay, India, to serve Standard Vacuum Oil Co., and Burmah Shell refineries. Merritt, Chapman & Scott Corp., contractors. (Crude and Products.)

• **Creole Petroleum Corp.**—25 miles, 34-in., planned, Lagunillas to La Salina (State of Zulia, Venezuela.)

Direccion General de Yacimientos Petroliferos Fiscales—409 miles, under way, Plaza Huincul to Bahia Blanca, Argentina.

• **Gaz de France**—200 miles, 12-in. Ruhr to Paris, France.

• **Petroleos Mexicanos.**—145 miles, 12-in., considered, 18 de Marzo field via Reynosa to Monterrey, Mexico.

100 miles, planned, Isthmus of Tehuantepec, Jose Colomo to El Plan field, Minatitlan.

72 miles, 12-in., proposed, Poza Rica to Atzacapotzalco, Mexico.

Petroleos Mexicanos.—125 miles, 10-in., under way, Jose Colomo to El Plan, Mexico.

• **Saskatoon Pipe Line, Ltd.**—56 miles, 6-in., planned, Milden to Saskatoon, Sask.

Texas Petroleum Co.—60 miles, 4-6-in., under way, Pta. Nino to La Dorada.

• **Trans Mountain Oil Pipe Line Co.**—30 miles, planned, Vancouver, B. C., terminal to Ferndale, Wash.

• **Yacimientos Petroliferos Fiscales Bolivianos.**—170 miles, 4-in., planned, Bermejo to Tupiza, Bolivia.

Foreign Products Pipe Lines

Columbian Ministry of Petroleum—115 miles, 4-in., under way, La Dorado to Cartago, Colombia, Williams Bros. Engineers.

93 miles, 8-in., under way, Cantimplora to Dorado, Colombia, William Bros. Constructors.

• **Empresa Nacional del Petroleo**—80

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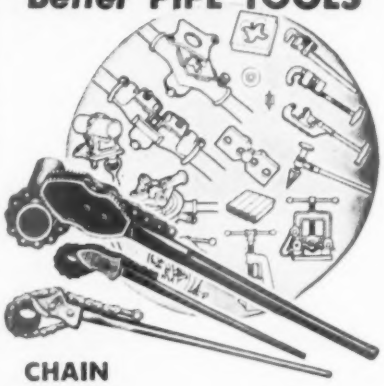

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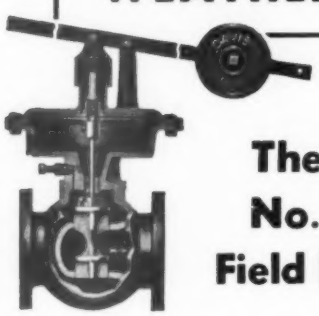

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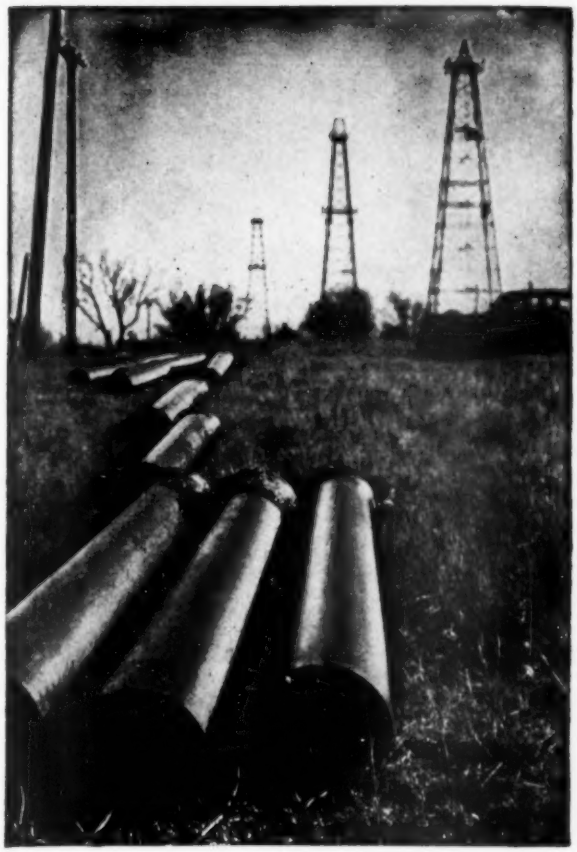

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A recipe that waterworks and gas distribution engineers have used for over a century is: *specify cast iron pipe.* Refinery engineers have used it, too—with good success—for run-down, water and gasoline lines—for fire protection systems—salt water disposal—condenser and cooling coils.

No other pipe, at reasonable first cost, offers comparable resistance to both interior and exterior corrosion. No other pipe, in its price range, is as economical in the end. Available with bell-and-spigot, plain end and flanged, or with standardized mechanical joints. Cast Iron Pipe Research Association, Thomas F. Wolfe, Engineer, 1015 Peoples Gas Bldg., Chicago 3, Illinois.

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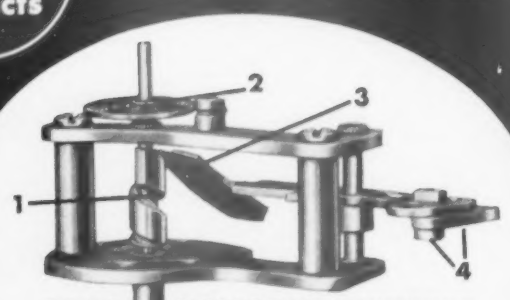

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miles, 6⅝-in., planned, Concon to Santiago, Chile.

Empresa de Ferrocarriles Ecuatorianos.—50 miles, 6-in., under way, Guayaquil to Palmira, Ecuador. J. A. Jones, contractor; C.R.C. Engineering Co., engineers.

• **Governments of Southern Rhodesia and Portuguese East Africa.**—200 miles, considered, Beria, Portuguese Mozambique to Umtalia, Southern Rhodesia.

North Atlantic Treaty Organization (NATO)—1,920 miles, 4-10-in., to serve military bases in Western Europe (to connect with U. S. Government's St. Nazaire-Paris-Metz line.) Contracted by Soc. Foster Wheeler Francaise.

• **Petroleos Mexicanos.**—124 miles, 6-in., planned, Lagos to Guadalajara, Mexico.

54 miles, 6-in., planned, Lagos to Aguascalientes, Mexico.

82 miles, 8-in., planned, Salamanca to Lagos, Mexico.

Shell Co. of Australia.—34 miles, 8-in., under way, Geelong, Melbourne Ref. to connect with installations at Newport, Australia, Taylor Woodrow. 11-53.

Sun-Canadian Pipe Line Co., Ltd.—200 miles, 8-in., under way, Sarnia, Hamilton, Toronto, Ont. Williams Bros. 10-53.

• **United States Government.**—375 miles, 12-in., planned, St. Nazaire to Melun and Metz, France.

• **United States and Canadian Governments**—600 miles, 8-in., planned, Haines to Fairbanks, Alaska.

Foreign Natural-Gas Pipe Lines

Azienda Generale Italiana Petroli.—110 miles, 12-14-16-in., under way, Cortemaggiore to Genoa. Completion date 11-53.

Azienda Generale Italiana Petroli — 90 miles, 12-in., under way, Cortemaggiore to Bologna, Italy, SNAM crews.

120 miles, 16-in., under way, Cremona Porto Mar to Ghera, Italy, Montubi, contractor.

40 miles, 12-in., under way, Ripalta-Bergamo, Italy.

Dirrecion General del Gas del Estado— 310 miles, 8-in., under way, Plaza Huincul to Neuquen, Argentina, to the vicinity of General Conesa, Argentina.

• **Empresa Nacional del Petroleo —** 80 miles, 10-in., planned, Concon to Santiago, Chile.

• **Mid-Continent Pipelines, Ltd. —** 1,860 miles, 30-in., proposed, Alberta to Montreal, Canada. Fish Engineering Co.

• **Northwest Natural Gas Co.**—950 miles, 24-in., planned, Alberta fields to Vancouver, B. C., Seattle, Wash., and Portland, Ore.

Petroleos Mexicanos. — 205 miles, 16-in., under way, Monterrey to Torreon, Mexico.

• **Petroleos Mexicanos.**—440 miles, 20-in., planned, Brazil to Tampico to Poza Rica, Mexico.

• **Trans-Canada Pipe Lines, Ltd. (Canadian Delhi Oil Co.)**—2,247 miles, 14 to 30-in., proposed, Alberta to Toronto to Montreal.

747 miles, 8 to 24-in., gathering system in Alberta.

• **Westcoast Transmission Co., Ltd.**—1,110 miles, 24-in., planned, Dawson Creek, B. C., through Pine Pass and Fraser River Valley to Kamloops, Princeton, and Vancouver to Portland. Ford, Bacon & Davis, engineers.

280 miles, 20-in., planned, Pincher Creek to Montana on to Spokane, Wash. Ford, Bacon & Davis, engineers.

138 miles, 20-in., planned, Sumas to Tacoma, Wash.

139 miles, 18-in., planned, Tacoma, Wash., to Portland, Ore.

• **Western Pipe Lines.**—833 miles, 24-in., proposed, from southern Alberta, eastward across the Canadian prairies, serving principal towns and cities along the route.

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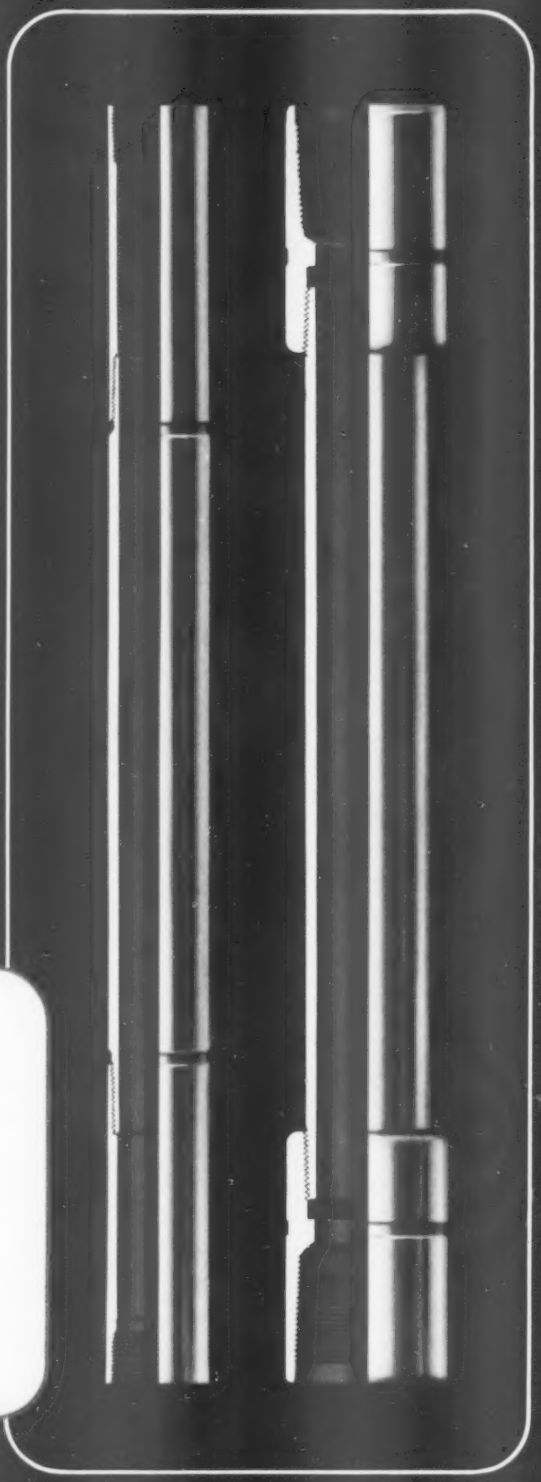

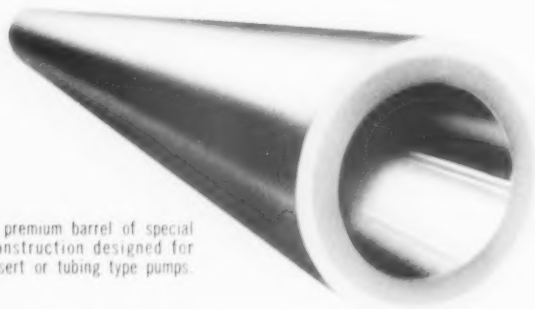

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NATURAL GAS

San Juan Basin Production Could Be Raised One-Third

WASHINGTON.—The Federal Power Commission has been told that natural-gas production in the San Juan basin of New Mexico and Colorado could be increased by one-third.

C. W. Binckley, a petroleum engineer for Phillips Petroleum Co., testified that his company is engaged in a workover program on existing producers which it expects will raise the basin's gas output about 35 per cent. The workover program is designed to prevent caveins which have been occurring in some shaly producing formations in open hole below the casing by running lines into the producing formations. Binckley pointed out that these caveins present the biggest problems involved in getting gas from the basin.

The testimony was presented at the commission hearing on Pacific Northwest Pipe Line Corp.'s application to transport San Juan basin gas to the Pacific Northwest. Opposing the application is Westcoast Transmission Co. and Northwest Natural Gas Co., which propose to supply the area with gas from Canadian fields.

Cities Service to Raise Gas Supply 40 M.M.c.f.

WASHINGTON. — Federal Power Commission has authorized Cities Service Gas Co. of Oklahoma City to construct new facilities which will be used to obtain about 40,450,000 cu. ft. of additional gas daily.

The new supply will come from the Golden Trend area of Central Oklahoma through a proposed 69-mile pipe line. Also, the company plans to install a 1,100-hp. unit at an existing compressor station.

The entire project will cost an estimated $3,000,000.

Marketed Gas Production Up 5.9 Per Cent in First Half

WASHINGTON. — Marketed production of natural gas averaged 23,305 M.M.c.f. per day for the first 6 months of this year for an increase of 5.9 per cent over the first half of 1952, according to the quarterly natural-gas report of the Bureau of Mines.

Data by quarters indicate that the larger gain came in the second quarter. Production in the second quarter averaged 21,887 M.M.c.f. per day for an increase of 7.4 per cent over the same period last year. The first quarter increase was 4.6 per cent.

Consumption data for the half-year period shows a larger relative gain in residential and commercial uses than in consumption by industrial accounts. Total residential and commercial consumption in the first half of 1953 accounted for 33.3 per cent of total use for the period compared with a 32.3 per cent portion for the first 6 months of 1952.

Northwest Alabama Seeks Gas From Southern Natural

WASHINGTON. — The Northwest Alabama Gas District is seeking Federal Power Commission authority to receive initially about 4,873,000 cu. ft. of natural gas daily from Southern Natural Gas Co.

The public corporation proposes to construct necessary facilities to distribute gas to Guin, Hackleburg, Haleyville, Hamilton, Sulligent, Winfield, Bear Creek, Boston, and Fayette, Ala. These facilities include approximately 40 miles of gas lines between Winfield and Southern Natural's transmission system running across northern Alabama through Birmingham to Atlanta. From Winfield to Haleyville a 26-mile line is planned with smaller lines running outward to the other customers.

Construction costs would amount to about $4,100,000.

Ohio Fuel Ups Deliveries

COLUMBUS.—Ohio Fuel Gas Co. has increased its transmission facilities in Northwest Ohio providing additional natural-gas supplies to customers in that area.

A 17½-mile line has been laid between Greencamp and a point north of Mount Victory, Ohio, running parallel to the company's existing Greencamp-Lima transmission system. Gas for both lines comes from two underground storages and from out-of-state.

The increased deliveries are going to the consumers served by West Ohio Gas Co. and Lake Gas Co., which includes Lima, Kenton, and Lakeview. Also, the communities of Ada, Alger, and Mount Victory are receiving more gas through the new line.

NATURAL GASOLINE

N.G.A.A. to Hold Regional Meet in Texas October 23

TYLER, Tex.—The Natural Gasoline Association of America will hold its first annual regional meeting here at the Blackstone Hotel October 23.

The meeting, sponsored jointly by the N.G.A.A. and East Texas Natural Gasoline Association of America, will be opened with an address by N.G.A.A. Vice President A. H. Weil, United Gas Pipe Line Co., Shreveport. The principal address, "Human Relations in Business," will be delivered by Dr. Willis M. Tate, vice president of Southern Methodist University, Dallas.

Papers to be presented at the 1-day meeting include:

"The Effect of Increased Gas Value on Plant and Lease Operation," L. A. Jackson, Warren Petroleum Corp., Tulsa; "Cures for Errors in Gas Measurement and Integration," J. L. Cottrell, Pittsburgh Equitable Meter Co., Tulsa; "Spray Loading of Tank Cars and Trucks and Other Good Practices," W. J. Rogers, Magnolia Petroleum Co., Dallas; "Tank Car Repair and Maintenance," Frank Wallace, Warren Petroleum Corp., Longview, Tex.; and "The Economics of Packaged Compressor Units at Gasoline Plants," E. S. McRoberts, J. B. Beaird Co., Shreveport.

L.P.G. Production Averages 651,000 Bbl. Daily This Year

WASHINGTON. — Production at natural-gasoline and cycling plants averaged 651,000 bbl. daily for the first 7 months of the year, according to the monthly report of the Bureau of Mines. The total included 130,000 bbl. daily from cycling plants and 518,000 bbl. daily from natural-gasoline plants.

Combined production for the January-July period represented an increase of 63,000 bbl. daily or 10.7 per cent over the same period last year.

Texas accounted for most of the gain over last year, with 68 per cent of the increase in this state credited to West Texas. The whole state produced 53 per cent of the light products in the 7-month period of 1952, but accounted for 69.7 per cent of the 1953 increase.

West Texas alone averaged 97,800 bbl. daily for the first 7 months of this year for an increase of 30,100 bbl. daily or 44 per cent over last year.

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PIPE LINE

Loops Completed

Southern Natural pushes work on $76 million job

BIRMINGHAM. — Construction of more than 196 miles of 24-in. main-line loops was completed last week across Mississippi, Alabama, and Georgia as a part of Southern Natural Gas Co.'s $76,000,000 expansion program.

A total of eight loops was laid by the contractor, H. C. Price Co. of Bartlesville, Okla., between Kosciusko, Miss., and Carrollton, Ga., on Southern Natural's main-transmission system from western Louisiana to Atlanta. Construction was started late last year.

Also, Houston Contracting Co., Houston, expects to finish next month about 637 miles of gas lines it started constructing last year for Southern Natural. These lines are located in the southern portions of the aforementioned three states, and in Louisiana and South Carolina. With the completion of this project, Southern Natural will lack about 425 miles of lines, primarily in southeastern Louisiana producing areas and west of the Mississippi River, in completing its 3-year expansion program.

When the program is completed next year, Southern Natural will have about 1,254 miles of new lines and an additional 22,250-hp. in compressor units. Also, the company will be able to handle 1,020,000,000 cu. ft. of gas daily for customers in Mississippi, Alabama, Georgia, and South Carolina *(The Oil and Gas Journal, October 20, 1952, page 196).*

Sinclair Delivering Through New 83-Mile Products Line

HOUSTON.—Sinclair Pipe Line Co. has begun making deliveries over its new 83-mile, 12-in. products line running from Sinclair's 125,000-bbl. refinery here to Port Arthur, Tex.

At Port Arthur the new line connects with the 183-mile, 16-in. Evangeline Products System, which is nearing completion. When the latter line goes into operation, products will be transported to Baton Rouge and into the existing Plantation pipe line there. This will give Sinclair uninterrupted products movement from Houston through five states to Greensboro, N. C.

The company now owns and operates more than 3,000 miles of products lines serving 14 states and the District of Columbia. In addition, Sinclair Pipe Line owns 20 per cent interest in the Evangeline System. The other 80 per cent is divided evenly between Texas Pipe Line Co. and Gulf Refining Co.

Salt Lake's Pasco-Spokane 8-In. Products Line to Open

SPOKANE.—Salt Lake Pipe Line Co. plans to begin deliveries the first week of October over its new 135-mile, 8-in. products line running from Pasco, Wash., to a point near here.

The line, which has a capacity of 12,000 bbl. daily, is an extension of the existing Salt Lake City-Pasco line. Lyles & Young Co., Avenal, Calif., constructed the line, and Morrison-Knudson Co., Boise, Idaho, installed pumping facilities at Pasco. The entire project, which was completed in mid-September, cost about $4,500,000.

Products will be received at new terminal here built and operatd by Petroleum Terminal Co., a wholly owned subsidiary of Phillips Petroleum Co. The new facilities will make Phillips products available in this area from the company's recently-expanded Wood Cross refinery near Salt Lake City. Phillips' refinery here will be shut down.

Part of Gulf Interstate's 850-Mile Gas Line Laid

BARTLESVILLE, Okla. — H. C. Price Co. construction crews have laid about 100 miles of 30-in. pipe along Gulf Interstate Gas Co.'s proposed 860-mile transmission system from southern Louisiana to northeastern Kentucky.

Price is laying about 355 miles of 30-in. line from a point near Gordonsburg, Tenn., northwestward to Gulf Interstate's terminal in Boyd County, Kentucky, between Ashland, Ky., and Kenova, W. Va. The remaining 505 miles of 30-in. line, running from the vicinity of Lake Charles, La., diagonally across northern Mississippi into central Tennessee is being handled by Houston Contracting Co. Below Lake Charles in the Gulf Coast region, Associated Pipe Line Contractors, Inc., Anderson Brothers Corp. and Williams Brothers Co. are laying more than 230 miles of natural-gas gathering lines.

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(The Oil and Gas Journal, June 8, page 149.)

The entire $130,000,000 transmission system is expected to be completed in November 1954. At that time Gulf Interstate will be able to deliver upwards of 375,000,000 cu. ft. of gas daily through the line to United Fuel Gas Co.'s system near Kenova, W. Va. The gas will be part of a pooled supply for Columbia Gas System, with which United is affiliated.

Sinclair Receives Write-Off For Expansion of Crude Line

WASHINGTON.—Accelerated amortization of part of a $2,447,800 project for expansion of its crude-oil system between Pauls Valley and Cushing, Okla., has been granted Sinclair Pipe Line Co. by the Office of Defense Mobilization.

The company has been granted certificates for quick write-off of 40 per cent of $178,000 for storage facilities at its Panova, Okla., station, 15 per cent of $1,566,500 for pipe-line facilities between Panova and Cushing, and 15 per cent of $102,500 for the right-of-way. Also, the company got a write-off for 25 per cent of $375,000 for pipe-line facilities north of Pauls Valley, and 25 per cent of $25,800 for right-of-way.

In addition, Sinclair Pipe Line plans to engineer and construct a 45-mile, 8-in. crude system from Badger Creek to Merino, Colo., in a joint operation with the newly-organized Goodall Pipe Line Co., Omaha. Goodall will hold the major interest in the line, which will receive between 12,000 and 18,000 bbl. of crude daily from the Badger Creek, Little Beaver, and Middlemist fields south of Merino *(The Oil and Gas Journal, September 28, page 165)*.

The line will connect near Merino with Sterling Pipe Line System, a 10-in. crude carrier which in turn connects near Gurley, Neb., with Platte Pipe Line Co.'s big trunk line to Wood River, Ill.

Kaw Finishing Crude Line

TULSA.—Kaw Pipe Line Co. here expects to complete next week a 15-mile, 4-in. crude-oil gathering system in Trego County, Kansas.

The new line, which will tie in with the company's existing 8-in. gathering system in Ellis County, Kansas, will service the Sunny Slope and Groff pools. Construction began in mid-September shortly after the company received Kansas Corporation Commission permission to construct the line.

Knupp Construction Co., Inc., Great Bend, Kans., is the contractor.

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REFINING

Union Expanding

Contracts awarded for new Platformer, cat reformer

LOS ANGELES.—Union Oil Co. of California has kicked off a $40,000,000 refinery-expansion program by awarding contracts for erection of a new Platformer and a catalytic reforming unit.

C. F. Braun & Co. will build a 14,500-bbl. U.O.P. Platformer and Bechtel Corp. will construct necessary outside facilities, utilities, and tankage at Union's 82,800-bbl. Oleum, Calif., refinery. The project, which will cost $5,750,000, will get under way early next year with completion set for November 1954.

A 600-bbl. catalytic reformer will be installed at the company's Cut Bank, Mont., refinery by Ralph M. Parsons Co. here at a cost of $600,000. Construction of the unit, which has been licensed from Atlantic Refining Co., will begin early next spring, and is scheduled to be in operation by September 1954. In connection with the new unit, Union plans to modify its crude-distillation tower to produce heavy gasoline as feed for the reformer.

Expansion plans . . . In addition, the huge expansion program includes plans for a catalytic desulfurization unit, a coker, a sulfur-removal unit and processing facilities, and a gasoline finishing unit and auxiliary equipment. These projects will be carried out at Union's various refineries in long-range stages.

Wax Refinery Being Built

SALT LAKE CITY.—A wax refinery is being built here by Sure-Seal Corp., manufacturer of plastic waxes.

The facilities will include a 500-bbl. per day combination topping and vacuum unit, and a methyl ethyl ketone two-stage deoiling unit with both clay contact and clay percolation units. The refinery will turn out all grades of finished waxes processed from Uinta basin waxy crude purchased from Carter Oil Co.

The installation, designed by Tears Engineers, Inc., Dallas, is expected to be completed and in operation January 1.

New Petroleum Measurement Tables Get A.P.I. Approval

NEW YORK.—The executive committee of the A.P.I. board of directors has voted to withdraw its approval of the National Standard Petroleum Oil Tables.

In lieu of these tables, established in 1936, the Institute now approves the recalculated and extended Petroleum Measurement Tables recently published jointly by the American Society for Testing Materials and the Institute of Petroleum.

The A.P.I. recommends that official regulations and contracts should be changed accordingly on January 1.

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue each month.
Explanation—"News Items that Appear in Quarterly Cost Indexes," July 7, 1952, pages 105 and 106.
Compiled by W. L. Nelson—Petroleum Refinery Consultant—Tulsa.
Indexes of Individual Equipment Items—January, April, July, and October.
Index (1946 = 100)

	1948	1949	1950	1951	1952	June 1953
Pumps, compressors, etc.	127.0	135.9	138.2	155.9	155.6	162.8
Electrical machinery	127.6	130.9	134.9	154.3	152.4	156.1
Internal combustion engines	116.9	124.8	126.0	146.1	146.5	147.8
Instruments	120.0	122.0	127.8	142.3	146.2	148.1
Heat exchangers	130.0	133.0	140.0	152.0	165.8	172.4
Miscellaneous equipment average	*122.1	*121.6	*126.2	*145.1	153.3	157.4
Materials component	139.3	143.6	149.5	164.0	164.3	171.6
Labor component	128.0	137.1	144.0	152.5	163.1	172.4
Refinery construction index	132.5	139.7	146.2	157.2	163.6	172.1

*Used in computing the Nelson Index until April 1952. These are slightly different than the average of the Miscellaneous Equipment Items shown above.

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1954, or as soon thereafter as practicable. Since this decision will affect thousands of contracts, it was announced promptly to provide the industry with as much advance notice as possible for substitution of the new tables in regulations, tariffs, and contracts.

Specifically, the standard from which approval is withdrawn is the National Standard Petroleum Oil Tables (National Bureau of Standards Circular C410, March 4, 1936). The newly approved standards are published in the volume A.S.T.M.-I.P. Petroleum Measurement Tables (A.S.T.M. designation: D1250; I.P. designation: 200).

Globe Erecting Cat Cracker

CHICAGO. — A second fluid catalytic cracking unit is being added to the Lemont, Ill., refinery of Globe Oil & Refining Co.

It is almost identical to the U.O.P.-designed unit erected several years ago with an initial capacity of 6,000 bbl. per day. The existing cat cracker has since been expanded about 100 per cent.

Conversion of some thermal cracking facilities and further modernization of the refinery will raise its crude capacity to about 43,000 bbl. per day. An HF alkylate unit, capable of producing about 1,200 bbl. of finished products per day also is under construction. Globe last year placed on stream a unit which converts hydrogen sulfide in refinery gas to elemental sulfur for manufacture of sulfuric acid.

Petrochemicals

American Cyanamid Installs Methylstyrene Pilot Plant

STAMFORD, Conn. — American Cyanamid Co. has in the pilot-plant stage at its research laboratories here, a new process for synthesizing a new form of methylstyrene from petroleum fractions.

Raw charge is petroleum toluene and acetylene from natural gas. The reaction product is catalytically cracked to produce the methylstyrene. Methylstyrene polymers, which are thermoplastics, find use in injection moldings, surface-coating resins, and low-pressure laminates.

Methylstyrene is now in experimental production at Stamford. American Cyanamid has not revealed whether it will follow through with commercial production.

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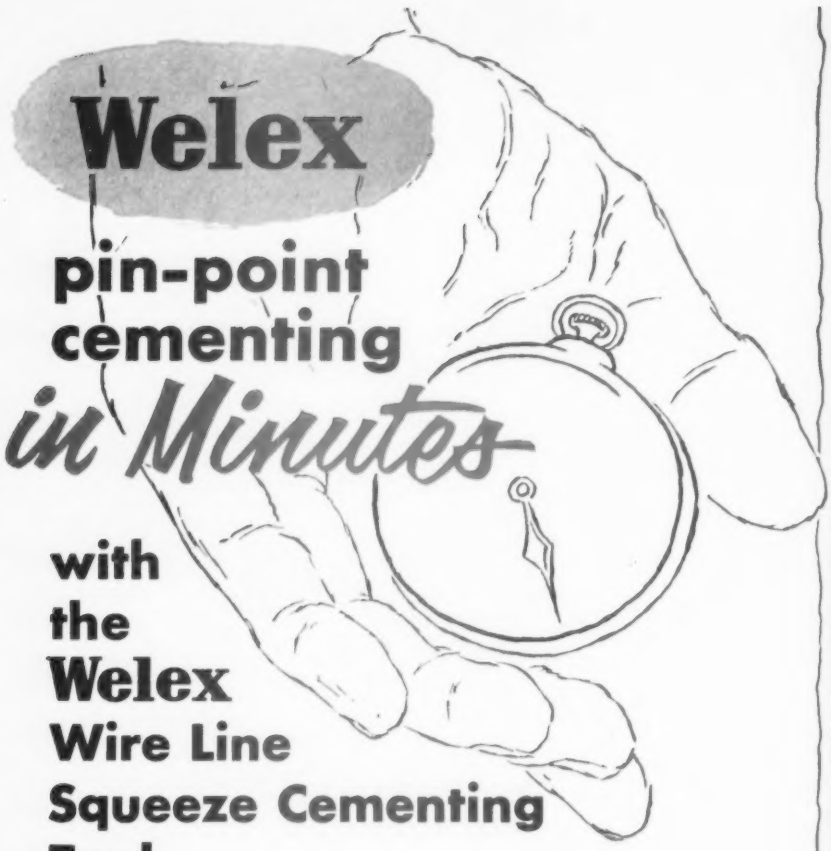

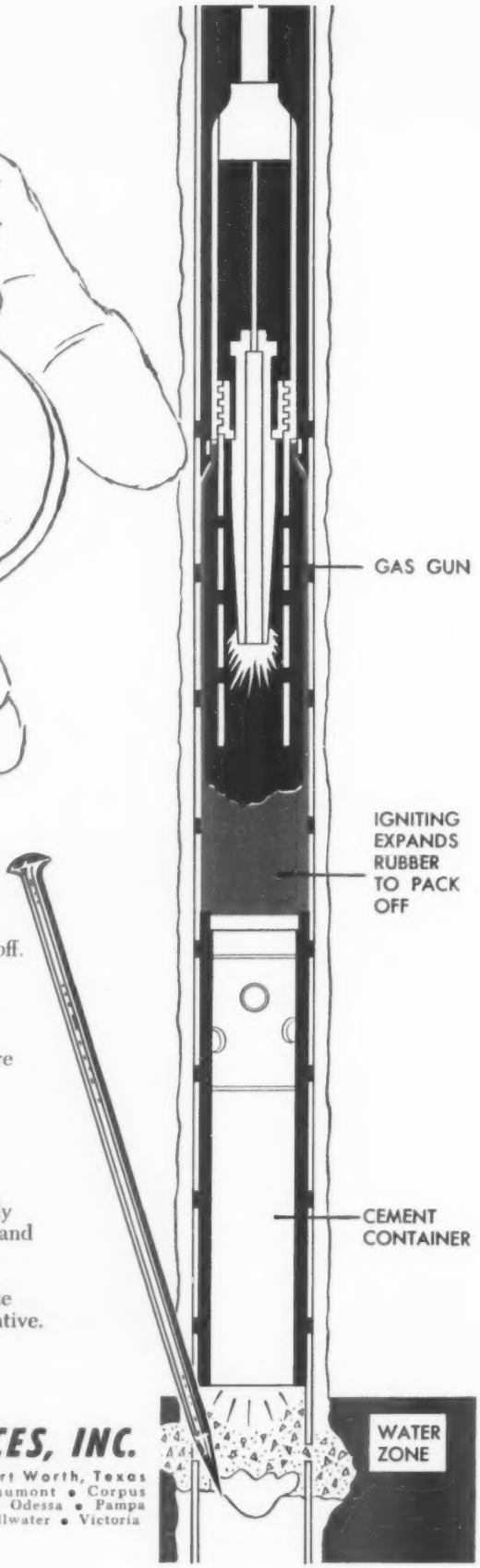

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Among the Drilling Contractors

California Contractor Drills Directional Hole

Santa Maria Drilling Corp., Long Beach, Calif., is undertaking a directional drilling project at Newport Beach, in Orange County, California. The project, a contract job for Monterey Oil Co. and Humble Oil & Refining Co., joint operators, involves drilling from a surface location outside the city limits to a bottom-hole location under tidelands within the city limits, where drilling is prevented by city ordinances. This also is the first exploratory drilling into offshore land in California since passage by Congress of the Submerged Lands Act.

Stanford Drilling Co. will drill General Petroleum Corp.'s new wildcat location, 1 Mahoney, in 8-10n-35w, a mile southwest of Guadalupe, in San Luis Obispo County, California. Location is approximately 3 miles southeast of the Guadalupe field.

R-B Well Service Co. has taken on a contract with Magnolia Petroleum Co. for a 9,000-ft. test to be drilled on the operator's Hiram Lyles unit in the Hurricane Creek area of Beauregard Parish, southern Louisiana.

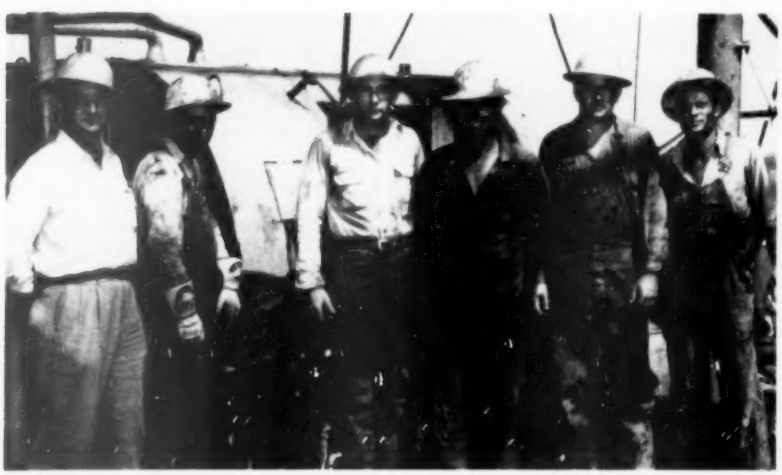
Jett Drilling Co. has two new wildcat operations under way in Amite County, Mississippi. Both are contract jobs for Sun Oil Co. One, 1-C Board of Supervisors, is a 7,500-ft. stratigraphic test, located 1½ miles northeast of Zion Hill, in 16-4n-4e. The other, 1 Whittington, is a 7,600-ft. test located approximately a mile southwest in 20-4n-4e.

Hunt Drilling Co., Inc., Corpus Christi, Tex.

HUNT DRILLING CO., INC., is one of the Gulf Coast's younger companies engaging in the drilling contracting business. Recently organized, it is directing its effect initially to the lower coastal area and southwestern

HULEN H. HUNT

W. KALTEYER



John Bowman (left) is tool pusher on the deep wildcat test Stanolind Oil & Gas Co. is drilling 6 miles north of Palacious, in Matagorda County, Texas Gulf Coast. With him, left to right, are: Dow Grammer, driller; and Carl Spears, Olin Ruth, Alvin Wright, and Morris Greer, crewmen. (Photo by courtesy of Mission Manufacturing Co., Houston.)

He's one of the well-informed Wells out among the wells in West Texas, where his long-time friends call him "Joe" for short, and his short-time friends just call him "Joe." ★ You've guessed it—we're talking about Joe Wells who sells Web Wilson Oil Tools. ★ If you happen to need a box of "Tiger Tooth" Tong Dies, Joe is your boy-on-the-bounce—and if you want to figure a complete rig deal, Joe can **really help you** with Web Wilson Tongs, Elevators, Links, a Hook and all the trimmings. ★ Just call Odessa 7-6501, or drop a line to Box 1012, and find out how right we are.

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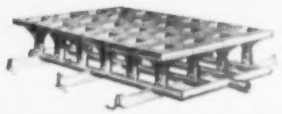

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Texas. Its main office at Corpus Christi is in the Wilson Building.

Personnel . . . Principals in the organization include Hulen H. Hunt, whose name the company bears, and Walter Kalteyer. Hunt, president of the company, previously had been associated for 13 years with the land departments of Gulf Oil Corp. and Gulf Refining Co. with service in the East, South, and Gulf Coast areas of Texas, and southern Louisiana.

Kalteyer, vice president and general manager, had been a petroleum engineer with Humble Oil & Refining Co. for 8 years, specializing in drilling equipment. Just prior to joining the new drilling company he was petroleum engineer for Humble's Imogene, Tex., district.

Coy Pyle, previously senior tool pusher for Allen & Morris, San Antonio drilling contracting firm, with which he had been associated for 10 years, is superintendent of drilling operations.

Equipment . . . Starting out, the company has one rotary rig but is contemplating the acquisition of another in the near future. The present rig is capable of drilling to depths of 8,500 ft. The proposed new rig will have a depth capacity of at least 10,000 ft.

Pike Drilling Co., Los Angeles, is contractor on a 10,000-ft. exploratory test being started by Helm Co. and Hans R. Sumpf in the Cantua Creek area of Fresno County, California. Location is for 84 Indart, in 32-17s-15e.

Blanton Drilling Co., Houston, has a 7,500-ft. test drilling for Christie, Mitchell & Mitchell at a wildcat location 3 miles southeast of Charco, in the Pargman area, Karnes County, South Texas. The test is 1 Schrade, in the Victor Blanco Survey.

ACTIVE ROTARY RIGS*

Area—	Week ended 9-28-53	Change week ended 9-21-53	Change week ended 9-29-52
Gulf Coast	540	+ 7	+ 22
N. & W. Tex.-N. M.	786	− 8	+ 68
Ark.-N. La.-E. Tex.	186	− 7	+ 54
Oklahoma	358	0	+ 35
Kansas-S. Nebraska	161	+10	− 6
Illinois-Eastern	156	+ 6	+ 4
Rocky Mtn.	272	+ 8	+ 16
Pacific Coast	176	+ 2	+ 15
Total U. S.	2,635	+18	+208
Western Canada	182	0	− 5
Total	2,817	+18	+203

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States, and the Rocky Mountains and western Canada areas are shown on pages 358 and 359.

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EXPLORATION

Powder River Activity Is Up Again

by Philip C. Ingalls

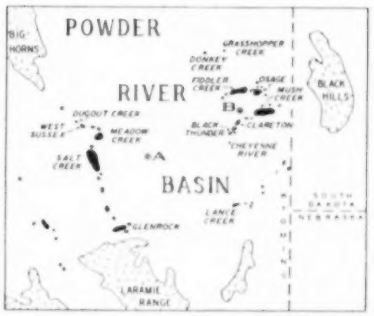
THE southern end of the Powder River basin of southeastern Wyoming is once again the scene of high exploratory interest and rapid development activity.

This has been the most active of the Wyoming basins through the years but, in general; activity at any given time has been concentrated in a limited area on one flank or another. Today, however, exploratory and development drilling is finding and steadily expanding new fields on both the eastern edge of the gently dipping east flank of the basin where stratigraphic traps were set up by the shorelines of the Cretaceous-Newcastle sea; and on the steeply dipping, highly faulted, structure-rich west flank with its many oil-bearing sands of Cretaceous age and older. Furthermore, a wildcat near the axis of the basin has had a sizable show of oil which has raised interest in the potentialities of the deeper portions of this sedimentary unit.

The greatest concentration of activity is in Weston County on the eastern flank of the basin. Here discoveries in the Newcastle sand are continuing to extend production south and west from the original discovery at Osage field and the more recent discoveries at Mush Creek, Fiddler Creek, and Clareton. Revival of this area began last January when Big Horn-Powder River Corp. and J. D. Sprecher 1 Wakeman, 1-42n-66w, 2½ miles south of previous Clareton production, was completed flowing 975 bbl. of oil per day through a ⅜-in. choke from the Newcastle at 6,678-84 ft.

A few months later came the Newcastle discovery in the Black Thunder area, more than 3 miles to the south of the 1 Wakeman. Voss Oil Co. 1 Scott, 23-42n-66w, was completed pumping 250 bbl. of oil daily. The most southerly production in the area to date was developed in August at W. F. Hammon 1 Gaskill, 14-41n-66w. This discovery well of Cheyenne River field flowed 1,500 bbl. of oil per day on a ½-in. choke from the Newcastle at 7,036-51 ft.

Meanwhile Newcastle production was found 2½ miles east of Mush Creek at a depth of only 1,275 ft. This extension well was good for 77 bbl. of oil per day on pump. Also, production was extended to the north into Crook County by two small discoveries, one in the Dakota (Donkey Creek) and the other in the Muddy (Grasshopper Creek).



Locale of the most active drilling campaign in the Rockies.

At B on map is Irving Pasternak 1-B Johnson, Newcastle discovery 3 miles west of the westernmost production in the Mush Creek area. This recent discovery was completed flowing 300 bbl. of oil per day from perforations at 5,707-16 ft.

Over on the west side of the basin activity has been highest in the Sussex-Meadow Creek area. Continental Oil Co.'s continued development of the Sussex unit has added the Jurassic-Sundance and the Pennsylvanian-Amsden to the list of producing formations that now number seven, four of which are Cretaceous sands. West Sussex field has been extended to the west by wells flowing at high rates from the Cretaceous-Shannon sand at only 2,900 ft. On to the northwest about 1 mile, Earl Mallette 1 Government, 33-43n-80w, was completed as the discovery well of Dugout Creek in the Cretaceous-Sussex sand at 1,783-1,803 ft.

At A on map is Union Oil Co. of California 1 unit, 29-40n-73w, Converse County. This wildcat, now coring below 9,500 ft., recovered gas and 250 ft. of distillate on a drill-stem test of the Sussex at 9,134-82 ft. This show is of high interest because sustained commercial production has not yet been found away from the edges of the basin.

The various kinds of trapping conditions and the many prolific pays offered by the Powder River basin can be expected to keep the area's operations at a high level for many more years.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

KANSAS . . . The Texas Co. 1 Graber, SE NE SW 30-29s-5w, big Simpson oil discovery in Kingman County in the Sedgwick basin, is shut in for a bottom-hole bomb test after flowing 403 bbl. of 43.9°-gravity oil in 11½ hours on ⅝-in. choke from perforations at 4,468-80 ft.

MISSISSIPPI . . . American Liberty Oil Co. and I. P. LaRue are testing oil from the Eutaw sand at 1 Hatten et al., 1-1s-14w, 1¼ miles northwest of Pistol Ridge gas production. The Pearl River County strike flowed an estimated 100 bbl. of 40°-gravity oil per day through ⅛-in. tubing choke. Successful completion of the discovery would give the Pistol Ridge-Maxie area its first oil well.

COLORADO . . . The California Co. has staked two new locations in the Black Hollow area of Weld County, following recovery of about 50 ft. of saturated sand in the Permian at the confirmation well to the 1 Baiamonte, recent Lyons sand discovery.

OKLAHOMA . . . Champlin Refining Co. has run 7-in. casing to 6,182 ft. at its Woods County 1 Dyer, NE NE SW 17-29n-17w, an indicated discovery in both the Simpson and Arbuckle. A near blowout was reported at the wildcat while testing the Arbuckle at 6,055-93 ft. A drill-stem test flowed gas at the rate of 9,980 M.c.f. per day and recovered 5 ft. of distillate.

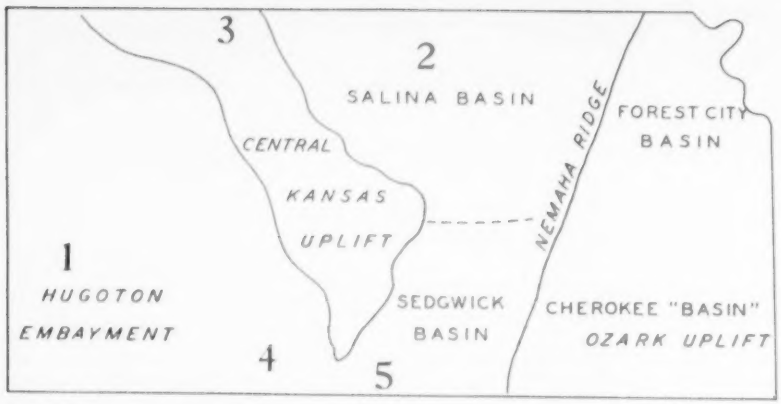


Fig. 1—Areas of the most significant developments in Kansas. Numbers on map are keyed to text.

Fig. 2—Map of the Hugoton embayment of southwestern Kansas and northwestern Oklahoma. Significant discoveries and development areas of southwestern Kansas are indicated by name.

Kansas Operators Making Hole At Record Rate This Year

by John C. McCaslin

DRILLING activity in Kansas is steadily climbing to a new record this year. Total completions for 1953 as of September 1 were 3,257, up 3 per cent over last year. The Journal has forecast a 6 per cent gain in completions over 1952 with operators expected to final 4,889 wells. More than 16 million feet of hole will be dug to make this record, compared to 15,500,000 ft. in 1952.

Wildcat completions in Kansas as of September 1 show a 4 per cent gain over 1952. Operators are expected to drill 964 test holes in the state this year, 14 per cent more than last year. Exploratory activity in the state has been heavy in all areas, particularly on the heavily-drilled Central Kansas uplift, the Salina basin, Hugoton embayment, and in southern areas.

The most significant developments this year are in the following areas (see Fig. 1): (1) the Hugoton embayment, (2) the Salina basin, (3) Norton County in northwestern Kansas, (4) the northern shelf area of the Anadarko basin, and (5) in the southern portion of the Sedgwick basin.

1 Hugoton embayment . . . The Hugoton embayment, which is the northerly extension of the Anadarko basin, has been consistently the Mid-Continent's most active rank wildcat area this year. Exploratory drilling has resulted in 25 new oil and gas discoveries in the area in 1953.

Excepting the huge Hugoton gas field, the Hugoton embayment is a sparsely productive area. The embayment includes the area between the Las Animas arch in eastern Colorado and the Central Kansas uplift. The recent tally of discoveries in the embayment, particularly on the flanks of Hugoton gas field, suggest opportunities for uncovering more important producing areas in southwestern Kansas. Increased wildcat activity is reported in Gove, Hodgeman, Meade, Seward, Morton, and Finney counties this year.

The most significant new producing area in Kansas is located just west of Hugoton field at Greenwood gas field in Morton County. Continued drilling is rapidly proving the field as one of the most important gas-producing areas in the Mid-Continent region. The field has 35 gas wells completed in the Topeka-Lansing lime and 3 in the Morrow sand.

Greenwood, which is Kansas' westernmost producing area, was opened by Cities Service Oil Co. in 1951 at 1 Greenwood "B," 10 miles west of Hugoton gas field, with production from the Morrow sand. The Topeka-Lansing lime pay was opened last December at Cities Service 1 Boehm, which had an initial production of 15,800 M.c.f. of gas per day. This new pay discovery set off the rapid expansion play in the area.

Greenwood field is being developed on a 640-acre spacing program with pay sands running from 2,850 to 3,225 ft. The average 20-minute flow test indicates a production of 20,000 M.c.f. of gas per day per well. Shut-in pressure in Topeka wells is 435 psi, and in the Morrow it is 1,025 psi. The area's first well was drilled on a seismic structure and completed at about 4,900 ft. The Morrow producing area of the field proved to be relatively small. There have been only two dry holes drilled in the development of the field.

Northeast of Greenwood field, Morton County's Richfield gas pool on the western edge of Hugoton gas field was recently extended 1 mile west by J. M. Huber Corp. The 1 Church gaged 5,200 M.c.f. of gas per day from the Morrow sand, promising further Morrow exploration off the west flanks of Hugoton field, which is a Permian producer.

Sparsely-productive Hodgeman County in the heart of the embayment received a new oil pool early this year. Atlantic Refining Co. opened Saw Log Creek pool at 1 Hall in 36-23s-22w with an initial production of 695 bbl. of oil per day on the pump from two zones in the Pennsylvanian-Marmaton lime.

Ford County's 1953 discovery is Helmers pool, a Mississippian gas strike. Successful wells in the East Kismet area of Meade County have extended that Morrow gas-producing area. Considerable extension activity has been reported in the Liberal-Light area in recent months, both in Beaver County, Oklahoma Panhandle, and in Seward County, Kansas. J. M. Huber et al gaged 140,865 M.c.f. of gas per day through open flow tests at a step-out ½ mile north of Liberal-Light pool for one of the best gas wells in the Mid-Continent region. Lansekan Co., Inc., recently completed a 2-mile extension northeast of Liberal-Light pool for a potential of 1,082 bbl. of oil per

day from the Lansing lime and 3,424 M.c.f. of gas from the Morrow sand.

In Finney County, off the northeastern flank of Hugoton gas field, W. L. Hartman completed 1 Finnup, opening Finnup pool. The discovery was finaled for 434 bbl. of oil per day from the Mississippian.

2 Salina basin . . . Four discoveries are reported in the southern end of the Salina basin of northeastern Kansas and southeastern Nebraska. This basin has no production except along its southern margin. It is bordered on the southwest by the Central Kansas uplift, on the east by the Nemaha granite ridge which separates it from the Forest City basin. The Chautauqua arch runs northeast-southwest along the southeastern edge of both these basins.

The Salina basin was opened to oil production in 1926 at Lost Springs pool in Marion County in the Mississippian. The first gas production was established in Morris County in 1928 from a shallow Pennsylvanian sand.

This year's most significant discovery in the basin was at National Associated Petroleum Co. 1 Olson, discovery well of Salemsborg pool in Saline County, a flowing Viola strike. The discovery well produced 200 bbl. of oil per day following acid treatment.

Another significant pool opener in the southern end of the basin was National Associated 1 Lively, 1½ miles west of Ritz-Canton pool in McPherson County. The Mississippian strike, which opened Lively pool, flowed 15 to 20 bbl. of oil per hour. These two discoveries, along with recent drilling activity in Smolan pool, and scattered wildcat tests in southeastern Nebraska, have further increased interest in this basin.

3 Norton County . . . Norton County's new Columbia field, located about 6 miles southwest of Norton in northwestern Kansas, appears to be one of the best strikes on the northern end of the Central Kansas uplift in recent years.

Jones-Shelburne-Farmer, Inc., report that its fourth operation in the new pool is indicating success after tapping the Arbuckle level with the field's discovery well. The pool opener was completed for a potential of 200 bbl. of oil per day natural in the Arbuckle. An east extension to the pool was completed for a potential of 241 bbl. of oil per day. A south ½-mile extension swabbed 15 bbl. of oil per hour after acid treatment. The field was discovered as a result of a play for a pinchout against the granite.

4 Northern basin shelf . . . Four new gas pools have been opened on the oil-shy northern shelf of the Anadarko basin this year. The shelf area extends into Clark and Comanche counties from Oklahoma, and is that area south of the Sedgwick basin lying to the west of the Nemaha granite ridge.

First gas production in Comanche County was opened last spring at Barbara Oil Co. 1 Robbins Ranch, opening Robbins Ranch pool. The Robbins Ranch area, which is 3 miles west of Barber County's Southwest Skinner gas pool, also a 1953 discovery, produces from the Mississippian.

Recently Barbara Oil Co. reported oil shows in the lower Morrow at a wildcat in Comanche County, brightening hopes of oil production in this area. However, the well was completed dry.

Recent Simpson oil discoveries in Grand and Wood counties, North-Central Oklahoma, have enhanced the outlook for finding more oil in the rank area to the north in Kansas. Facies changes from basinal sands to platform limestones in the Pennsylvanian create a definite oil-producing possi-

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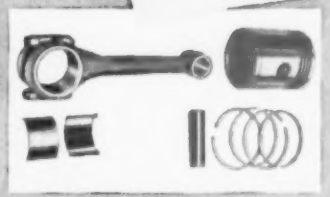

Connecting rods are drilled and have precision shell bearing inserts. Pistons are assembled in matched sets

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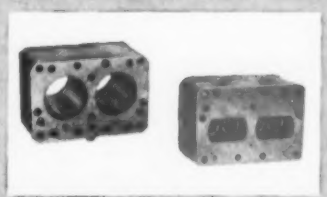

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bility on the northern basin platform, particularly in the Clark and Comanche county area.

5 Sedgwick basin . . . Six new oil and gas discoveries have been completed in the southern portion of the Sedgwick basin, which is the area lying between the southeastern limits of the Central Kansas uplift and the Nemaha range.

The most significant new gas discovery in this area was in rank Harper County where The Texas Co. opened a Simpson gas pool last spring at 1 Springer. The discovery well was completed for 3,000 M.c.f. of gas per day. The remote new pool is 17 miles east of Grabbs pool. Barber County has three new gas pools, one new oil pool. Wildcat activity is heavy in Reno, Kingman, and Sumner counties.

The latest significant discovery in the Sedgwick basin is in Kingman County at The Texas Co. 1 Graber, SE NE SW 30-29s-5w, 9 miles southeast of Basil pool and 42 miles north of Grant County, Oklahoma's recent Simpson strike. Three drill-stem tests of the Simpson developed flowing oil and gas. Bottom-hole pressures were over 1,700 psi.

The Texas Co. strike adds incentive to the intensified search for Simpson production on the northern shelf of the Anadarko basin and in the southern portion of the Sedgwick basin. Harper County to the south of Kingman County has some Simpson gas production, but most production in Kingman County is from the Mississippian.

MICHIGAN

Norman L. Stevens was acidizing a gas and rainbow oil show in the Traverse at a new and possibly important Porter Township wildcat, Van Buren County. This was the 1 Montford, SW SW SW 11-4s-13w, located about 2 miles east of Lawton Traverse oil pool. Traverse lime objective top was logged at 1,178 ft. Shows of oil and gas were reported at 1,179 ft. Well was being acidized at 1,181 ft., present total depth. No indications of results of acid treatment were available.

First Detroit River "sour zone" oil well for Cranberry Lake pool, Winterfield Township, Clare County, appeared to be assured as Miami Operating Co. & Leonard Drilling Co. reported that their B-1, State-Winterfield, NW SE SW 2-20n-6w, was flowing at about 10 bbl. of oil an hour on initial tests after acid treatments. Well was not being flowed 24 hours a day, but only as long as casing pressure did not decline too rapidly or to an unsafe level. The B-1 State-Winterfield was drilled and tested out dry in the Richfield, main producing horizon for Cranberry Lake wells, at 5,143 ft. After Detroit River pay perforations at 4,785-89, 4,802-06 and 4,816-22 ft. were acidized with a total of 3,500 gal., well flowed back 120 bbl. of net oil 7 hours; 98 bbl. in 9 hours; and 82 bbl. during another 9-hour flow period.

Shows of oil, which may be retested later, were logged at two points in the Traverse

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at the H. E. Walton 1 Olson, SE NW NW 26-11n-7w, Douglass Township wildcat, Montcalm County. Wildcat was being prepared for deepening to the Dundee after first Traverse show was logged at 2,922 ft. and second showing, which was reported good for 7 gal. of free oil in 6 hours, and was considered to be the possible making of a small producer with acid, was logged at 2,932-33 ft. Long string of 5-in. casing, set at 2,919 ft., was being pulled and hole was to be reamed from that point to 2,965 ft. for drilling to the Dundee.

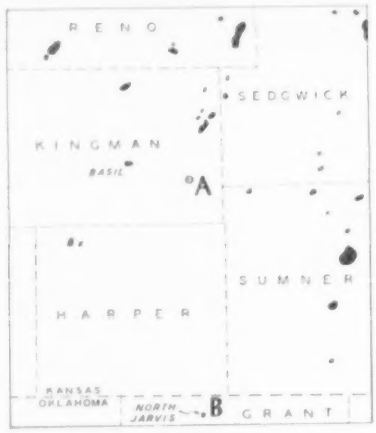
KANSAS

Kingman Discovery Flows Oil From Simpson Dolomite

The Texas Co. has a flowing Simpson dolomite discovery at 1 Graber, SE NE SW 30-20s-5w, 9 miles southeast of Basil pool. The southeastern Kingman discovery has 5½-in. casing set on bottom at 4,614 ft. Three drill-stem tests flowed Simpson dolomite oil, cut at 4,464 ft. and Simpson sand logged at 4,487 ft., with bottom-hole pressures over 1,700 psi.

On the first drill-stem test taken at 4,460-75 ft. in the dolomite gas showed at the surface in 10 minutes and the well flowed oil in 1 hour. A test at 4,474-82 ft. flowed gas in 5 minutes and oil in 12 minutes. Shut-in pressure was 1,665 psi. in 20 minutes. A drill-stem test taken at 4,482-93 ft. flowed gas in 8 minutes and oil in 40 minutes.

The 1 Graber kicked off and flowed 195 bbl. of oil with no water during the first 5½ hours of the latest test. The well was shut in for awhile, and then opened to flow 32 bbl. of oil per hour on a 5⁄8-in. choke. Tubing pressure was 60 psi.



The Texas Co. 1 Graber in Kingman County (A on map) kicked off and flowed 195 bbl. of oil on latest test during the first 5½ hours. The Simpson oil discovery is located 9 miles southeast of Basil pool, and about 45 miles north of newly-opened North Jarvis Simpson oil pool in Grant County, Oklahoma (B on map). These two recent Simpson discoveries give encouragement for further exploiting of the potentialities of the Ordovician-Simpson sands on the northern shelf of the Anadarko basin and the southern end of the Sedgwick basin.

New Pools Named

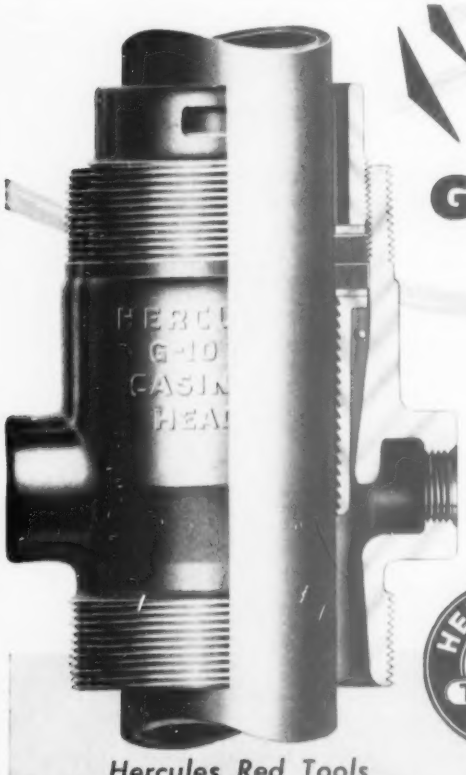
The Kansas Nomenclature Committee in Wichita has given names to 11 oil and 2 gas pools in the state. The Central Kansas uplift, Hugoton area, Salina basin, and southern Kansas all report new pools.

Central Kansas uplift . . . Sunray Oil Corp. 1 Converse, NW NE SW 20-20s-15w, completed for 3,758 M.c.f. of gas per day from the Arbuckle, opens Converse pool in Barton County. Kraus North pool was opened by United Drilling Co. 1 Kraus, SW SW NE 17-14s-19w. The discovery well of the new field was finaled for 168 bbl. of oil per day from the Arbuckle in Ellis County. Also in Ellis, Don Pratt opened Leiker East pool at 1 Brock, SW SW SW 12-15s-18w.

In Ellsworth County Petroleum, Inc., 1 Janzen, SW SW NW 12-17s-9w, opens Lorraine North pool in the Lansing. Trans-Era Petroleum 1 Holzhuer "A," SW SW NW 26-10s-21w, finaled for 132 bbl. of oil per day from the Arbuckle, opened Noah East pool in Graham County. Imperial Petroleum opened Diebolt pool at 1 Diebolt, NW NE SE 33-10s-23w, as a Lansing discovery in Graham, also.

In Pawnee County Vickers Exploration 1 Sweeney, NW NW NE 8-21s-15w, opens Sweeney pool. The Arbuckle gas pool was opened for 6,160 M.c.f. per day. Berland East pool is a new pool in Rooks County at 1 Berland, NE NE SW 20-10s-19w, producing from the Arbuckle. Locker pool is Trego County's new pool at Carl Todd Drilling Co. 1 Locker, NE NE NW 5-14s-21w.

Hugoton embayment . . . Damme Northeast pool is opened by Lauck 1 Graves, SE NE NE 16-22s-33w, off the northeast flank of



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the Hugoton gas field. The discovery was finaled for 147 bbl. of oil per day from the Mississippi.

Salina basin . . . In Morris County, east-central Kansas, Nelson West pool was opened by Musgrove Petroleum 1 Bura, SW NW SW 30-17s-5e. The pool opener was completed making 60 bbl. of oil per day from the Mississippi.

Southern Kansas . . . Ayesh and Taylor 1 Beamer, SE SE NE 10-32s-7e, Cowley County, was completed for 25 bbl. of oil and 2,000 M.c.f. of gas per day from the Layton sand, opening School Creek North pool. In the Wichita area of Sedgwick County Cottage pool is new at Charles Carlock 1 Nickles, SW SW SE 19-25s-2e. The pool opener is a Burgess producer, finaled for 20 bbl. of oil per day.

OKLAHOMA

Near Blow-Out Reported At Big Woods Discovery

Champlin Refining Co. 1 George Dyer, NE NE SW 17-29n-17w, reported a near blowout during a test in the Arbuckle. The well flowed gas in 1½ minutes, gaged at 9,980 M.c.f. per day on test at 6,055-93 ft. The near blowout occurred when pulling drill pipe out. Mud was kicked out of the hole by the wet gas flow.

Previously, a test at 6,037-55 ft. flowed gas in 3 minutes, increasing from 4,075 M.c.f. at the end of 5 minutes to 7,000 M.c.f. at the end of 45 minutes. Five feet of distillate was recovered on the test. In the Simpson oil flow was estimated at 60 bbl. per hour on earlier tests taken at 5,882-90 ft. Gas-distillate pay was indicated on tests at 5,862-75 and 5,830-55 ft. in the Simpson dolomite and in the Viola at 5,614-35 ft.

Successful completion of the new Simpson discovery would make it the most significant strike in Oklahoma this year, opening rank Woods County to first production.

CANADA

New Strike in West Drumheller Area Reported

The West Drumheller area of southern Alberta has chalked up another new oil discovery zone this week. This time it was the green shale member of the Devonian—a section lying between the D2 and D3 oil zones—and a section that had never before indicated commercial oil production in Alberta.

Hudson's Bay Oil & Gas Co., Ltd., Canadian operating unit of Continental Oil Co. of the United States, this week discovered vugular porosity and oil-staining in green shale cores at its 2-1 West Drumheller driller, LSD 1, 2-30-21w4. Drill-stem test in that formation, from 5,609 to 5,641 ft., flowed natural gas in 15 minutes, at estimated rate of 17,000 cu. ft. daily, and gave a 55-minute pipe recovery of 525 ft. of 31.5°-gravity crude oil. This triple-zone oil success (D2 zone was previously assured of oil production and D3 later yielded light oil), is about 60 miles northeast of Calgary.

Drilling is continuing at the Hudson's Bay tri-zone oil success, below the D3 water table, which was entered at 5,661 ft., or 2,999 ft. subsea. The well found 17 ft. of oil-productive reef before encountering water. Completion procedure at the well has not as yet been announced.

Erskine area . . . The only other discovery reported in western Canada during the past 7-day period was made by the team of Federated Petroleums, Ltd., Home Oil Co., Ltd., and Alminex, Ltd., at a step-out driller in the Erskine area, a few miles northwest of Stettler.

This venture, Oilwell Operators 14-18 Erskine, LSD 14, 18-39-20w4, 2¼ miles northeast of Erskine area D3 oil wells, found D3 water-loaded, but was chalked up as a natural gas discovery in the basal quartz sand. Drill-stem tests below 4,396 ft. flowed natural gas at rates up to 1,700,000 cu. ft. daily, and indicated 35 ft. of gas pay zone prior to entering water. The well is being plugged back for completion as a gas well.

EASTERN CANADA

Gaspe . . . In the Gaspe peninsula, Quebec, three out of five wells sponsored by Gaspe Oil Ventures of Montreal are drilling. The 2 Bald Mountain is below 5,920 ft. and checking samples closely for indications of coral reef formation.

On the Galt Brook dome, Continental 1 deep test, is deepening below 3,162 ft. after cementing to overcome caving due to creviced and fractured zones. The 1 Asphalt base, already making oil from 1,196-1,202 ft., encountered a second oil show at 1,565-70 ft., and is deepening after a shot at 1,575 ft., necessary when the hole was found to be off vertical.

The 1 Tar Point, making gas from 7,069 ft., is shut down awaiting casing and control equipment. The 2 Quebec is standing capped at 6,000 ft.

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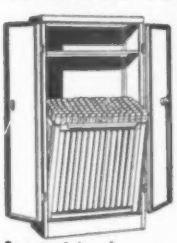

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MISSISSIPPI

Pistol Ridge Gas Area May Get Oil Producer

A discovery by American Liberty Oil Co. and I. P. LaRue in northeastern Pearl River County is showing promise of being the first oil production in the general Pistol Ridge - Maxie area, which heretofore has yielded only gas and condensate.

The discovery is at the above operators' 1 Hatten, located in 1-1s-14w, approximately 1½ miles northwest of the Pistol Ridge field, where testing of showings encountered in Eutaw sand is under way. Cleaning to pits, the well, on 8/64-in. choke, was flowing oil at an estimated rate of 100 bbl. per day with gas-oil ratio of 500 cu. ft. per barrel and tubing pressure at 850 psi.

Interval being tested is at 7,416-21 ft., where casing was perforated after hole had been plugged back to 7,451 ft. from a total depth of 8,750 ft. in the lower Tuscaloosa, where no commercial shows were encountered.

Pistol Ridge field, across the county line in southwestern Forrest County, was discovered in January 1951. Four wells have been completed, one each in the Wilcox and upper Tuscaloosa sands, and two in the lower Tuscaloosa. All have been shut in for lack of outlet, and no other close development has been done. This field, and its neighboring Maxie field, 4 miles northeast, are indicated to be major gas-condensate producing reservoirs with prospects of becoming connected. Maxie field, discovered by Ohio Oil Co. in June 1952, now has six wells, two being completed in Eutaw sand and four in the lower Tuscaloosa. As in the Pistol Ridge field, all are shut in. In addition, a small lower Tuscaloosa gas well has been completed about midway between the two fields.

Nearest well in the Pistol Ridge field to the new American Liberty and LaRue oil discovery is the discovery well, drilled by LaRue and associates and completed in upper Tuscaloosa sand. The equivalent Eutaw sand in this well was found poorly developed, and approximately 10 ft. lower structurally than the base of the sand in the new discovery.

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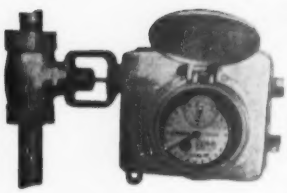

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CALIFORNIA

Deeper Pool Find Enhances Rosedale Ranch Possibilities

A southeast edge test by Standard Oil Co. of California at Rosedale Ranch field, south central San Joaquin Valley, gave promise of greatly increasing that field's importance. On a 1-hour formation test at 4,685-4,717 ft., 38-1 K.C.L. flowed 22°-gravity crude at an estimated daily rate of 1,000 to 1,500 bbl. Following the test the operator prepared to set 8⅝-in. casing at 4,685 ft. for completion in the new zone.

Rosedale Ranch was discovered in 1945 by Standard but only two producers had been completed by last year. Since then eight additional wells have been completed to bring the field's output to about 1,000 bbl. daily. All are located in 1-29s-26e and produce from the Lerdo sand (Pliocene) at about 4,100 to 4,300 ft.

The new discovery is thought to be in the Chanac, upper Miocene, with the top called at 4,364 ft. All recent wells completed have been bottomed in the Lerdo sand so that the new pay may underlie a portion of the already developed area.

Union Adding 14,000-Ft. Pay at Torrey Canyon

Union Oil Co. was in process of completing a deep test in Torrey Canyon field, Ventura County, through 2,330 ft. of perforated 5-in. liner landed at 14,989 ft. Perforated intervals were at 12,737-13,479 ft. and 13,989-14,888 ft., or from 3,000 to 4,000 ft. below the field's regular 10,000-ft. lower Sespe pay.

Formation tests of the upper interval have indicated the well, 92 Torrey in NE NW 5-3n-18w, will make a flowing producer. It likewise will make a producer in the Sespe-transitional zone, which was cased off at 12,740 ft. The new deeper pay is reportedly in Eocene formations.

New Eocene Tests Staked

Richfield Oil Corp. has staked location for two Eocene tests in the foothills along southwest San Joaquin Valley. In the Elkhorn Hills area 6 miles southwest of Maricopa, 32-11n-24w, 1 Moore will be drilled to about 8,000 ft. The other wildcat, 2-D San Emideo, will be drilled 1 mile southwest of the Pleito Creek field, in 3-10n-21w.

New Zone for Wheeler Ridge

A northeast edge well has indicated the Valv zone will be productive in the Wheeler Ridge-Eocene area discovered by Richfield Oil Corp. 18 months ago. In addition to these two pays, Vedder and Olcese sands (Miocene) have proven productive and an

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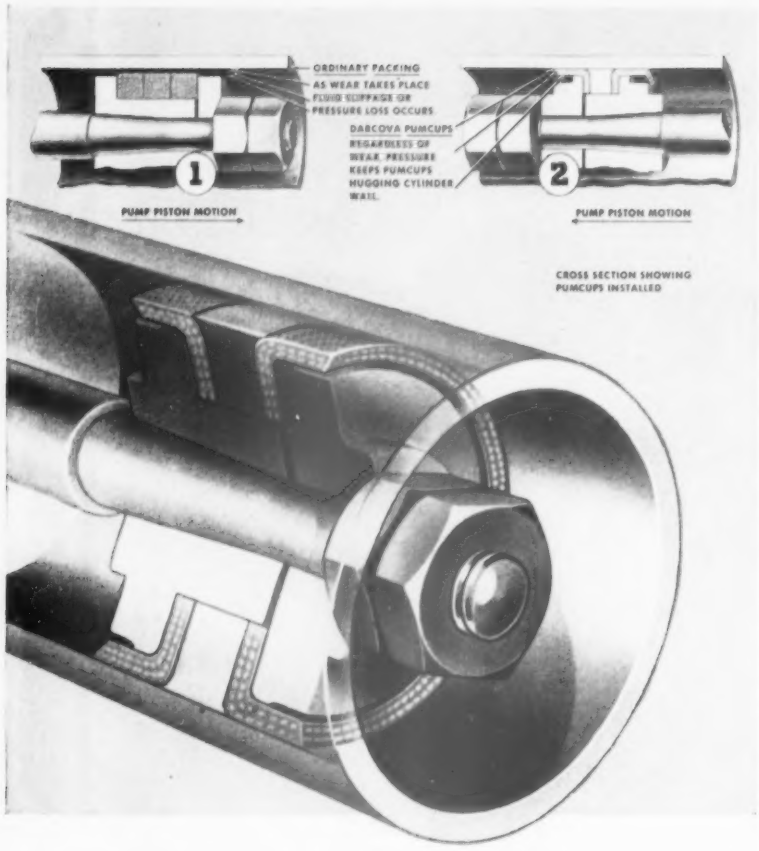

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Oligocene sand has indicated it will produce gas.

Richfield 124 Gordon, in SW NW 28-11n-20w, was drilling for the Olcese when the new pay was encountered. A flow at the daily rate of 192 bbl. of oil and 4,100 M.c.f. of gas was recorded during a 3-hour test at 3,327-70 ft. Following the test drilling was resumed toward a deeper pay.

Long Beach Airport Test Drilling

The Texas Co. was drilling below 5,000 ft. at the first of two tests to be made on the 1,040-acre Municipal Airport lease it recently obtained from the City of Long Beach. Drilled from a site adjacent to the airport, 1 Long Beach Airport will be carried to 12,000 ft. or to basement.

TEXAS

WEST TEXAS

Pecos Well Flows on Tests in Connell Sand

Cities Service Oil Co. and Stanolind Oil & Gas Co. et al 1 Payton, Devonian gas-condensate discovery in Pecos County, flowed gas and distillate on a test of the Connell sand.

The well was gaged for an average of 3,790 M.c.f. of gas per day on drill-stem test at 9,815-65 ft. Recovery was about 135 bbl. of distillate per day. Gas-distillate ratio is 54,000:1. The discovery is located in Section 99, Block 8, H&GN Survey, 3 miles southwest of Grandfalls.

Second Crane Test Flows Ellenburger Oil

Crane County's Lea Ellenburger field has been confirmed with the flow of an estimated 1,377.6 bbl. of oil per day on a drill-stem test of Gulf Oil Corp. 2 Lea, the discovery well's southeast offset. The test was made at 8,244-8,344 ft. Top of the Ellenburger is 8,218 ft. The confirmation well to the new field is located in Section 39, Block 32, PSL Survey, 12 miles west of Crane.

Ellenburger Strike Seen In Andrews Offset Well

An Ellenburger discovery is due at Magnolia Petroleum Co. 2-EA Fasken, northwest diagonal offset to a Wolfcamp discovery well. Recovery was 2,100 ft. of oil and 10 ft. of heavily oil-cut mud on drill-stem test in the interval 12,593-612 ft. Another test is being taken at 12,612-627 ft. Location is Section 12, Block 42, Township 2 North, G&MMBE&A Survey, 9 miles southeast of Andrews.

Andrews County News

The Texas Co. 1 Parker, Honolulu Oil Corp. 1-C Parker, 1 mile west of Andrews, recovered free oil on a test of the Wolfcamp. The well, which is the south offset to Andrews Wolfcamp field's discovery well, recovered 7,520 ft. of free oil on a test at 8,554-8,600 ft. Location is in Section 18, Block A-46, PSL Survey.

Fred Turner, Jr., 1 Parker, Wolfcamp discovery well, is flowing at the rate of 22 bbl. of oil per hour, estimated natural. The well is 3¼ miles south of Andrews.

Stanolind Oil & Gas Co. 1 Fasken "Y," diagonal southwest offset to 1 Midland Farms "AE," Grayburg discovery in southeast Andrews, has found free oil on a drill-stem test. Recovery on test at 4,700-4,832 ft. was 1,890 ft. of oil. The well is located in SW¼ Section 45, Block 41, T-2-N, G&MM-B&A Survey, 12 miles southeast of the city of Andrews.

Flowing Ellenburger Well Assured Southern Andrews

Anderson-Prichard Oil Corp. is assured a flowing Ellenburger discovery well at 8-F Cowden after flowing oil was developed on a drill-stem test at total depth 12,330 ft.

The well flowed 55 bbl. of oil the first hour, 53 the second hour, and 17 bbl. during the last 15 minutes. Total flow was 126 bbl. of oil in 2 hours and 15 minutes on the test taken at 12,280-330 ft. Gravity of the oil is 50°, no water. The new discovery is located in Section 102, W. F. Cowden Strip, SF 9956, 10 miles southwest of the town of Andrews.

EAST TEXAS

New Discovery Noted In Camp County Area

W. D. McBee has a new Pittsburg sand discovery indicated at 1 H. G. Hatley, 3 miles southeast of Newsome in the western part of Camp County.

A drill-stem test at 8,178-94 ft. recovered 1,900 ft. of fluid, no water reported. Pre-

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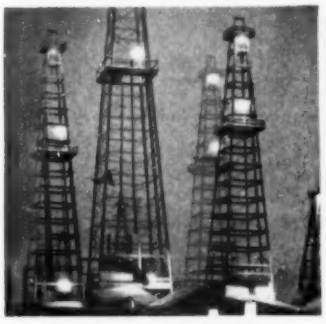

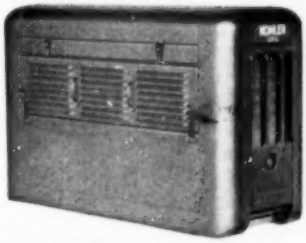

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1922	13	1,682	1938	93	5,219
1923	13	1,757	1939	85	5,810
1924	9	1,689	1940	51	6,102
1925	5	2,100	1941	51	5,873
1926	19	2,261	1942	41	6,170
1927	6	2,095	1943	55	6,030
1928	20	2,307	1944	49	6,561
1929	21	2,108	1945	57	6,770
1930	23	3,043	1946	66	6,738
1931	6	2,772	1947	59	6,895
1932	7	3,474	1948	62	6,842
1933	9	2,663	1949	38	7,334
1934	25	3,026	1950	52	6,966
1935	58	3,510	1951	66	7,421
1936	106	3,932	1952	52	7,895

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TOTAL FOOTAGE: 7,258,765 ranging from 1,400 to 14,110 feet

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viously the well had recovered 290 ft. of black 16°-gravity oil and 50 ft. of heavily oil and gas-cut mud on a test at 3,854-57 ft. in the sub-Clarksville. Successful completion of this new discovery will open production 3½ miles southwest of Pittsburg field.

The discovery is location in the Samuel Sexton Survey, A-106.

Anderson Strike Flows Woodbine Oil Before Shut-in

A new Woodbine oil discovery in Anderson County, 4½ miles northeast of Neches, is shut in after flowing 138 bbl. of oil per day.

Humble Oil & Refining Co. 1 Northeast Neches Oil Unit 1, in the F. Curbier Survey, 1½ miles southeast of Boggy Creek field production, is waiting on potential test. The discovery flowed from the top of the Woodbine through perforations at 4,704-10 ft. on 3/16-in. choke.

SOUTHWEST TEXAS

Extension Wells Widen Production in Bay Area

Production of two fields in the Corpus Christi Bay area of Nueces County is being widened by extension wells drilled by Arkansas Fuel Oil Corp.

A quarter mile west of the Mustang Island field, this company has completed its 2 State Tract 456, in Corpus Christi Bay, flowing at the rate of 7½ bbl. of oil per hour through 10/64-in. choke with 810 psi. tubing pressure. Production is from the field's No. 9 sand with casing perforated at 7,398-7,411 ft.

Approximately the same distance west of the Cayo Del Oso field and about 1½ miles southwest of the Flour Bluff field, same county, the company's 1 Koemel filled 6,500 ft. of oil in a 17-minute drill-stem test at 6,646-50 ft. in the field's Frio "J" sand. No water was indicated. Casing has been run through the indicated pay sand to bottom of the hole at 6,700 ft. Location is in Section 32, Encinal Farm Tracts Subdivision.

NORTH TEXAS

D. D. Feldman Oil & Gas Co. 1 Baily is a new oil discovery in northern Grayson County, 4 miles northeast of Sadler. The well is completed after flowing 192 bbl. of oil per day through 13/64-in. choke. It is located in the James Coryell Survey A-261, ⅔ mile east of Mulder Ellenburger production.

Official gage is reported at Jack Grace Production Co. 1 Hodge, Wise County Caddo discovery. The well flowed 140 bbl. of 42°-gravity oil on a 6-hour test through 32/64-in. choke from perforations in the Caddo at 5,523-31 ft. The discovery is 4 miles west of Alvord in Section 3, Cooke CSL Survey, A-156.

APPALACHIAN AREA

OHIO

Drilling has now spread over a good part of New Castle Township, Coshocton County, three wells being completed during the week. In the north part of the Township, the W. E. Shrider et al. 3 Donis Singer found the Clinton at 3,122-3,176 ft. with a good show of oil that increased to 550 bbl. in 24 hours after fracturing. In the southwest part, Mossholder Drilling Co. 3 Ida Williams,

with sand at 3,335-3,393 ft., made 25 bbl. natural and 520 bbl. in 24 hours after treatment, while in the southeast part Pure Oil Co. 2 C. O. Giffen logged sand at 3,235-3,282 ft. with 8 bbl. natural and 52 bbl. in 10 hours after treatment.

Another producer was added to new Shearer pool. National Gas & Oil Co. 3 C. G. Conrad, second quarter, Bethlehem Township, Coshocton County, topped the Clinton at 3,371 ft. and made 18 bbl. natural and 202 bbl. after fracturing.

WEST VIRGINIA

In Webster County, West Virginia, Gregory Gas Co. has started a new wildcat test, 1 C. D. Howard Hrs., elevation 2,250 ft., Cowen Quadrangle, 0.10 mile south of Lat. 38° 25′ and 3.05 miles west of Long. 80° 30′. Drilling is at 500 ft. West Virginia Gas Corp. is at 1,820 ft. in 1-575 Dewey Given. Gore district, Hampshire County, M. E. Anderson will run sandfrac treatment in 1 Woodrow McBride. This will be done in the Oriskany sand which was reached at 5,602-5,734 ft. Gas was encountered at various intervals from 5,604-5,639 ft., all pays testing 29,000 cu. ft. The total depth of the hole is 6,030 ft.

NEW MEXICO

SOUTHEAST NEW MEXICO

Lower Delaware Production Indicated at Eddy Test

Richardson & Bass 1 Fidel-Federal, Eddy County wildcat 11¾ miles southeast of the 1 Cobb-Federal, lower Delaware discovery well, has indicated production in the lower Delaware, also.

The well kicked off following fracture treatment and flowed at the rate of 19 bbl. of oil per hour. Testing continues. The well is drilled to total depth of 15,611 ft., plugged back to 11,991 ft. Perforations are at 6,890-6,950 ft. The indicated strike is in Section 27-21-29, 15 miles east of Carlsbad.

Depth Record Set

Richardson & Bass 1 Harrison-Federal, about 25 miles south of the 1 Cobb-Federal, lower Delaware discovery well, is running 7-in. casing. Bottom is 16,635 ft., setting a new depth record for New Mexico.

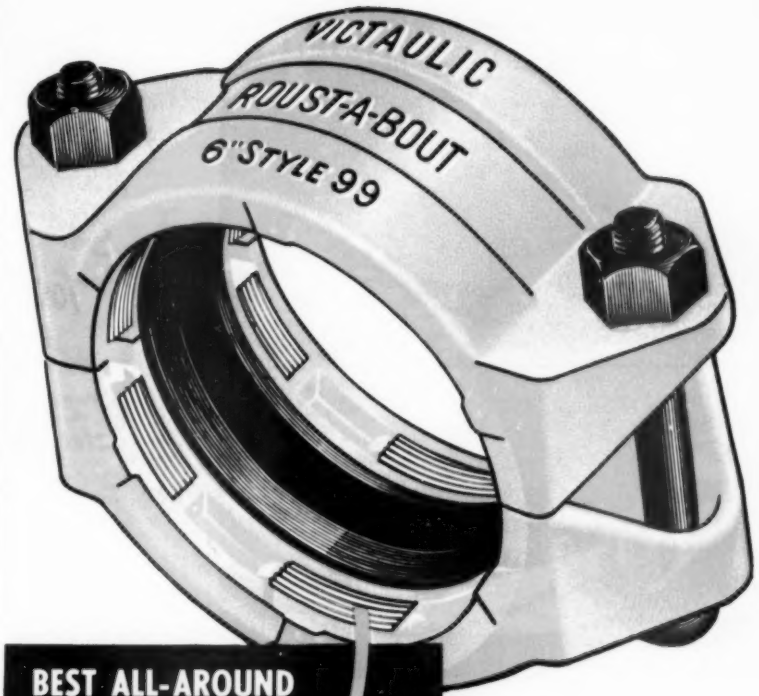
ILLINOIS

Cypress Discovery Made In Marion County Area

C. R. Winn, Paul Holleman and Ollie Husk have a new wildcat discovery at 1 Singer, NW SE SW 4-3n-1e, 1 miles south of Patoka in Marion County.

The well got 290 ft. of clean oil, 128 ft. of oil-cut mud, no water, on a drill-steam test in the Cypress sand at 1,349-55 ft. Bottom hole pressure was 425 psi.

The discovery was made after sub-surface geology work. The Cypress sand is a very prolific sand, when trapped in the proper structural conditions. The sand has excellent porosity and permeability. This sand is found deposited in fairly large bodies in the Illinois-Kentucky-Indiana area.



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ROCKY MOUNTAIN

NORTH DAKOTA

Dunn County Deep Test Starting

Carter Oil Co. and Sinclair Oil & Gas Co. have moved in tools for 1 Lockwood, SE SW 5-147n-93w, the first wildcat on a unitized block in the Carsin area of Dunn County. Objective depth is approximately 12,500 ft. Socony-Vacuum Oil Co. is also an interest holder in the block.

Fryburg Discovery Nears Completion

Amerada Petroleum Corp. has tested a flow of 347 bbl. of oil in 23½ hours at 1 May, C NW NE 9-139n-100w, in the Fryburg area of Billings County. Production is from the Madison at 9,404-39 ft. Tests followed plug back from total depth of 13,325 ft. after lower horizons offered only slight shows with no commercial encouragement. The flow included 57 bbl. of water during the last 14 hours of testing. Tests followed acidization of the open interval. Tubing pressure during the test was 200 psi., somewhat below that of wells producing on the Nesson anticline in Beaver Lodge field to the north.

An offset to the Fryburg Madison discovery is drilling below 8,600 ft. after having been established as a possible new pay discovery in Heath (?) at 8,204-44 ft. The well is Amerada's 1 Logan, C SW SW 4-139n-100w. Production from the Heath sandstone would be the first of significance from a sandstone pay on the United States side of the Williston basin.

COLORADO

New Lyons Exploration Started

Amerada Petroleum Corp. has spudded 1 State, NW NE SE 16-11n-68w, northwest of Weld County's Black Hollow discovery. Shell Oil Co. will test Big Blue at 1 Biggs, C SE SW 20-11n-57w. There two wildcats are the latest evidences of expanding deep interest northeast and northwest of Permian production in Weld County. Ohio Oil Co. has confirmed the fact that it has under consideration the deepening of 1 Nordloh, SE SE SE 20-5n-63w, a Cretaceous failure at a total depth of 7,985 ft. which was drilled in 1951. C. C. Thomas, Denver independent is to be associated with Ohio in a part of the exploratory program planned for this area. Ohio has considerable lease holdings through the area, as do several other substantial operators.

Weld County Permian Confirmation Will Produce

The California Co. has cored about 50 ft. of saturation in the Permian Lyons sand at 1 UPRR, NE SW SW 31-8n-66w, Weld County, for an apparently successful confirmation of its recent Permian pool opener in the Black Hollow area.

Core from 8,870-8,907 ft. included 12 ft. of porous, saturated sand, and a second core 8,907-58 ft. included 38 ft. of sand, saturated except for thin tight streaks. No tests have been run of the well, and the operator will set casing before attempting any testing program. There was no evidence of formation water in cores recovered from the Lyons sand. The well is the first apparent success

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in an attempt to confirm a Denver-Julesburg basin pre-Cretaceous discovery. Sherrod & Apperson's discovery in the Keota field of Weld County became a one well pool when other deep drilling in the area produced water with non-commercial oil shows.

The California Co. has announced locations for two additional Black Hollow wells. The first is 2 UPRR, C NE SW 31-8n-66w. Another will be drilled at 1 State, C SE SE 36-8n-67w.

MONTANA

Casing Set on Daniels County Wildcat

Carter Oil Co. is running casing at 9,229 ft., total depth at 1 Danelson, C NE SW 12-36n-47e, in the Whiskey Buttes area of Daniels County. The well had shows in Mississippian and Devonian formations, but failed to produce oil on drill-stem test of the formations. Extensive testing will follow setting of casing.

Several recent wells in the extreme northeastern part of Montana has had Mississippian and Devonian shows, but all have so far failed of commercial encouragement on tests.

Stanolind Stakes Two Montana Prospectors

Stanolind Oil & Gas Co. has made location for two important tests of the Montana portion of the Williston basin. The company will drill 1 NPRR "C," C NE NW 15-9n-58e, in the Pennel Creek area of Fallon County. The wildcat is to test Ordovician at about 9,400 ft. It is about 3 miles southeast of Shell Oil Co.'s discovery in the Cabin Creek area of this county, where more than 1,000 ft. of apparently effective pay was found through Mississippian, Devonian, Silurian and Ordovician zones. Completion was in Ordovician for 244 bbl. of oil per day, but a combined gage from Ordovician and Silurian made 4,253 bbl. of oil daily. Upper horizons were not tested.

The Dawson County wildcat is about equidistant from Richey and Deer Creek fields. The area has had no previous drilling.

WYOMING

Tip Top Wildcat Finds Tertiary Gas

General Petroleum Corp. reported a flow of gas at the rate of 76,000 cu. ft. per day on test of the Baxter at 18-20 Unit, SW SW SW 20-28n-113w, in the Tip Top area of Sublette County. Tool was open in the interval 4,062-4,127 ft. and there was gas at the surface after 35 minutes. The wildcat is to test Beckwith at about 8,500 ft. The area has been of considerable interest as a potentially important gas producing area since recent release of data showing substantial results in a current program in Big Piney field. The well is also important to further exploration in the overthrust belt on the west side of the Green River basin in the vicinity of General Petroleum's Nugget discovery in the Tip Top area.

Deep Southern Powder River Basin Test Has Gas Shows

Union Oil Co. of California is reported to have encountered gas shows of sufficient volume to threaten a blowout at 1 Unit, W½ SE SE 29-40n-73w, 30 miles north of Glenrock in Converse County. The wildcat is the first test of the Powell Unit, assembled earlier this year by Union and by Brazos Oil & Gas Co. The operator has not revealed details of the reported show. It was encountered at about 9,500 ft. and is believed to be in Shannon sand. Objective is the Third Frontier at about 11,500 ft.

LOUISIANA

SOUTH LOUISIANA

Two Deep Tests Started In New Bakerstown Area

Two additional deep tests already are under way in the Bakerstown area of St. Mary Parish, where Southern Natural Gas Co. has opened what appears to be an important new gas-condensate producing field. Location also is reported to have been made for another.

Southern Natural's discovery well, 1 Placito Tamporello, completed 2 weeks, found gas-condensate production in two deep zones, and potential oil production in another. Testing a casing-perforated interval at 11,195-201 ft., it flowed at the rate of 16,000,000 cu. ft. of gas daily. From a shallower zone, perforated at 11,071-81 ft., it flowed at the rate of 7,000,000 cu. ft. of gas daily through ¼-in. choke. In both tests, the gas carried a heavy spray of distillate.

Previously, it tested a deeper zone at 11,901-22 ft., from which it flowed initially at the rate of 250 bbl. of oil per day. However,

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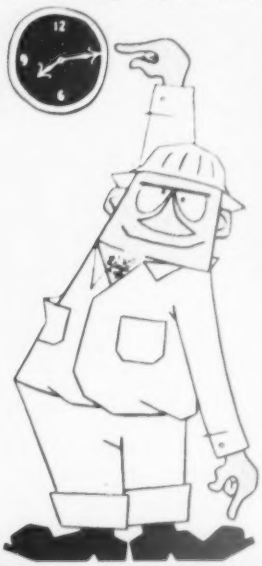

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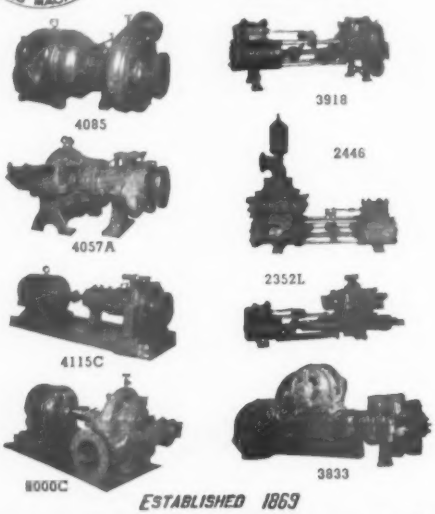

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with water encroachment, the zone was shut off and the well completed in the upper gas-condensate pays.

Southern Natural has started its second test, 2 Placito Tamporello, southwest of the discovery well, and Fidelity Oil & Royalty Co. is drilling at 1 Shannon, a half mile northeast of the discovery. An additional location northeast of the discovery is reported.

Cutoff Wildcat Produces

California Co. and Superior Oil Co. have a new discovery well in Lafourche Parish. It is their 1 Cloverly Corp., located in the Cutoff area, 7 miles southwest of the West Delta Farms fields, and about the same distance southeast of the Valentine field. Production at the rate of 308 bbl. of 33.1° gravity oil per day through 9/64-in. choke was reported on the well's potential gage.

NORTH LOUISIANA

Wilcox Hunt Expands

Hunt Oil Co. and Gulf Refining Co. have an indicated Wilcox discovery at C-7 Angelina Hardwood Lumber Co., SW SW 20-5n-8e, Concordia Parish. Log and samples indicated oil showing in the Wilcox at 6,374-77 ft. and 6,477-6,502 ft. Production tests are due. This indicated new Wilcox find is located 5 miles southeast of Monterey and 6¼ miles southwest of Deer Park.

At the same operators' C-9 Angelina Hardwood Co., C SW SW 17-4n-7e, tanks are being built for official test. The new oil discovery is the east offset to Barnett Serio's 1 Quinn, C SE SE 18-4n-7e, completed in 1952, as a dry hole. One mile west of the 1 Quinn dry hole, E. C. Wentworth, Justiss-Mears Oil Co. and Serio A-1 Quinn, SE SE 13-4n-6e, is due official testing after tank construction. The Wilcox strike flowed by heads and cleaned to pits. The erratic nature of the Wilcox in eastern Louisiana is shown by the fact that two wildcats found Wilcox production, but are separated by a dry hole at a distance of only 1¾ miles apart.

WILDCAT COMPLETIONS

SOUTHWEST TEXAS

Atascosa County: H. H. Howell 1 Schumann, A. S. Donovan Sur. 145, A-194. Dry. TD 3,950 ft.

Monterey Exploration Co. 1 Smith, James Scott Sur. 208, A-776. Dry. TD 6,664 ft.

Bastrop County: Paul Dixon 1 Williams, James Doyle Sur. Dry. TD 1,581 ft.

Caldwell County: L. R. Mabry 1 Schuenemann, W. C. Williams Sur. Dry. TD 1,825 ft.

Gonzales County: Plymouth Oil Co. 1 Cooper, Samuel McCoy Sur., A-340. Dry. TD 2,200 ft.

Hidalgo County: La Gloria Corp. 11 South Weslaco Gas Unit, J. J. Y. de Balli Sur., A-54. Dry. TD 9,105 ft.

Jim Hogg County: Jake L. Hamon and Edwin L. Cox 1 Silver Lakes Ranch, Surey 300-1, A-223. Dry. TD 3,799 ft.

Jim Wells County: Fidelity Oil & Royalty Co. 6 Reed & Kindsay, Lavaca Grant, A-166. IP 12,000 M.c.f. daily with 40 BC per M.c.f., open flow, Yegua 8,155-71 ft. and 8,175-8,200 ft. (casing perforations). TD 8,525 ft. (New pay in Alice field.)

W. Earl Rowe 1 Josefa G. De Perez, Share 5, La Tinaja de Lara Grant, A-36. Dry. TD 5,333 ft.

Kenedy County: Humble Oil & Refining Co.

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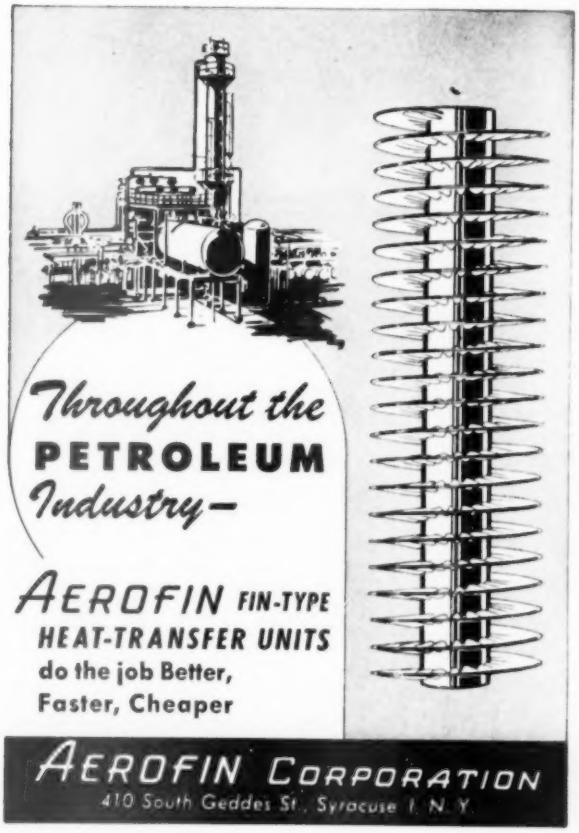

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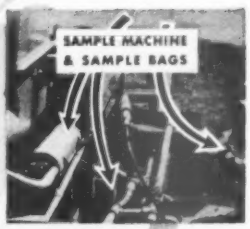

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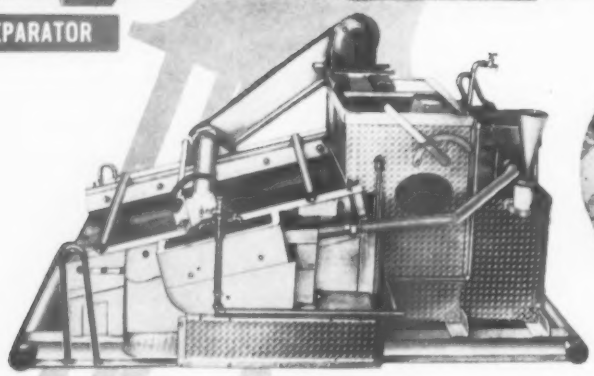

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1 King Ranch Tio Moya, San Juan de Carricitos Grant. Dry. TD 12,000 ft.

San Patricio County: Lee Brothers Oil Co. and Kirkwood & Morgan, Inc., 1 Miller, E. J. McGloin Sur., A-24. Dry. TD 5,025 ft.

Travis County: P. J. Aylward 1 Nelson Brothers, P. C. Harrison Sur. 3. Dry. TD 1,221 ft.

E. R. Marts 1 Fuchs, G. Gates Sur. 63. Dry. TD 670 ft.

E. R. Marts 1 Wood, R. G. Sanders Sur. Dry. TD 785 ft.

Williamson County: B & G Oil Co. 1 Stiles, J. Bevl Sur. Dry. TD 872 ft.

Webb County: Harold K. Boysen 1 Servando Benavides, Survey 690. Dry. TD 2,193 ft.

Long Brothers 1 E. P. Wilmot est., S. Vanover Sur. 201, C-594. Dry. TD 2,626 ft.

Don H. Marsh 1 Catto, CCSDRGNS Sur. 602, A-2269. Dry. TD 902 ft.

Zapata County: Hawn Brothers 1 Gutierrezm Block 5, Cullinan Subd., Las Comitas Grant. Dry. TD 3,058 ft.

TEXAS GULF COAST

Bee County: Pontiac Refining Co. and McKenzie Brothers Drilling Co. 1 Scott, Jose Maria Uranga Lge., A-68. Dry. TD 3,381 ft.

Chambers County: Standard Oil Co. of Texas 1 Felis Jackson est. 2, Garner Mayes Sur., A-183. Dry. TD 9,604 ft.

Fort Bend County: W. J. Rasnick 1 Rasnick and West & Schenck, Thomas Habermacher Sur., A-191. IP 264 BOPD, ¾-in., 22°, casing perforations 3,659-70 ft. TD 4,075 ft. (New pay in Blue Ridge field.)

Harris County: Lenoir M. Josey, Inc., 1 Freeman, W. L. Mounds Sur., A-1376. Dry. TD 7,793 ft.

The Texas Co. 1 Harman Hospital est., William C. Perkinson Sur., A-623. Dry. TD 8,500 ft.

Karnes County: Harris S. Stahl 1 Huchlefeld et al, Don Erasmo Seguin Lge. Dry. TD 4,150 ft.

Jefferson County: Magnolia Petroleum Co. 1-B Quinn, David Burrell Lge., A-68. Dry. TD 10,709 ft.

Live Oak County: V. G. Schimmel et al 1 West et al, Nelson Owen Sur. 56, A-313. Dry. TD 3,658 ft.

Matagorda County: Brewster-Bartle Drilling Co., Inc., 1 Silver Lake Ranch, Inc., John Duncan Sur., A-140. Dry. TD 9,110 ft.

J. M. Huber Corp. 1 Serrill, Bowman & Williams Sur., A-9. Dry. TD 10,750 ft.

Orange County: Sun Oil Co. 1 Williams, Malcom S. McAlpin Sur., A-133. IP 176 BOPD, 9/64-in., 49°, casing perforations 8,095-8,150 ft. TD 8,570 ft. (New field, East Doty.)

EAST TEXAS

Anderson County: Fort Bend Oil Co. 1 Exie Cummins Williams et al, Thomas Kinley Sur., A-450. Dry. TD 1,877 ft.

Harrison County: Woolfe & Magee 1 Harris, GH&H Sur. Dry. TD 6,902 ft.

Henderson County: Happy Gist 1 Thompson, Sanford Holman Sur., 1 mile N of Tri-Cities field. Dry. TD 6,487 ft.

Wise Drilling Acc't and Ralph Spence 1 Tarkington, William K. Newell Sur. Dry. TD 4,618 ft.

Panola County: H. L. Hawkins and E. S. Kelly, Jr., 1 Louis Werner Sawmill Co., John Hubbard Sur. IP 2,000 M.c.f. of gas per day, open flow, 12/64-in., perfs. lower Pettit 6,150-57, 6,170-82, 6,198-6,207 ft. TD 6,270 ft. (Gas discovery.)

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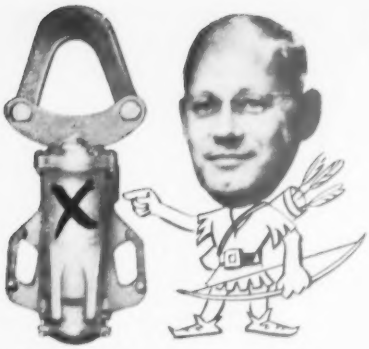

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WICHITA FALLS, TEXAS

WILDCAT COMPLETIONS

Sabine County: Stephens and Phillips 1 Madge Cox, Naomy Mackey Sur. A-38. Dry. TD 8,055 ft.

Stanolind Oil & Gas Co. 1-A Clara Low Bohannon, Matthew Parker Sur. Dry. TD 8,475 ft.

Shelby County: Sperry-Young Production Corp. 1 W. C. and J. H. Windham, A. H. English Sur., A-185. IPP 38 BOPD, perfs. 3,420-45 ft. TD 3,425 ft. (Oil discovery.)

Smith County: Humble Oil & Refining Co. 1 Hubbard Times et al, Geo. Slaughter Sur., A-866. IPF 197 BOPD, 41-6°, ¾-in., top pay 8,015 ft. TD 8,323 ft. (Pettitt oil discovery.)

Wood County: F. R. Jackson 1 Ramey, J. Crockett Sur., A-131. Dry. TD 6,275 ft.

WEST CENTRAL TEXAS

Brown County: Gilchrist Drilling Co. 1 Tongate, W. G. Gooselay Sur. Dry. TD 2,054 ft.

Ronald R. Perkins 1 Balkum, J. McGowan Sur. Dry. TD 1,815 ft.

Callahan County: Tom G. Donoca 1 Kennard, Sec. 9, ETRR Sur. Dry. TD 2,585 ft.

Rogers & Thomas 1 Wylie, Sec. 56, Lunatic Asylum Lands Sur. IPP 23 BOPD, top pay 295 ft., 39°. TD 299 ft.

Coleman County: F. Kirk Johnson 1 O'Hair, M. D. J. Trevino Sur. Dry. TD 2,366 ft.

J. J. Lynn 1 McCormick, Sec. 249, Caldwell CSL Sur. IPF 32 BOPD, 8/64-in., 42°, top pay 1,115 ft. TD 1,120 ft.

F. Craig Morton 1 Shields, Blk. 127, Sec. 272, Wade H. Bynum Sur. Dry. TD 2,394 ft.

Eastland County: O. M. Evans Drilling Co. 1 Bender, 27-3-BBB&C. Oil well, top pay 985 ft., 41°. TD 1,058 ft.

McClung & West 2 Strickland, Sec. 45, H&TC Sur. Dry. TD 1,178 ft.

Jones County: Allison & Prestridge 1 Nease, B. Gossett Sur. 7. Dry. TD 4,785 ft.

S. C. Herring Drilling Co. 1 Goodrich, Berry & Coggins Subd. 44, Mark W. Dikes Sur. 218. Dry. TD 5,513 ft.

Mayfair Minerals, Inc., 1 Glenn, 1-2-GH&H Sur. IPF 416 BOPD, top pay 3,107.5 ft., 32/64-in., 40.4°. Top Swastika 3,107 ft. TD 3,160 ft.

Neely & Neely 1 Moss, Sec. 16, Deaf & Dumb Asylum Lands Sur. 99. Dry. TD 2,763 ft.

Sun Oil Co. 1 City of Abilene, 74-14-T&P. IP 1,229 M.c.f. of gas per day, Caddo perfs. 4,540-44 ft. TD 5,100 ft. (Shut-in gas well.)

Palo Pinto County: Pat Dalton 1 Dalton, Peter Miller Sur. A-312. Dry. TD 1,753 ft.

F. Kirk Johnson 1 Hart, Sec. 1714, TE&L Sur. Dry. TD 2,606 ft.

Shackelford County: West Central Drilling Co. and B. W. Fitzgerald 2 Hendricks, Sec. 159, ETRR Sur. Dry. TD 1,604 ft.

Taylor County: S. C. Herring 1 Kendall. IPF 128 BOPD, ¾-in., 39°, top pay 4,376 ft. TD 4,425 ft.

Murphy Oil Co. of Oklahoma, Inc., et al 1 McCree, 22-18-T&P Sur. Dry. TD 5,319 ft.

NORTH TEXAS

Archer County: M. W. Blair 1-B R. Campbell, TE&L Sur. 1812. Dry. TD 1,147 ft.

M. W. Blair 1-C Campbell, TE&L Sur. 1379. Dry. TD 1,025 ft.

I. Dee Campbell 1 Daume, SPRR Sur., Sec. 1, A-422. TD 1,835 ft.

Fortex Oil Co. 1-C J. B. and H. N. Ferguson, SPRR Sur. A-416. Dry. TD 1,737 ft.

John and Pat O'Neil 1 Perkins, Blk. 4, J. J. Perkins Subd., J. Poitevent Sur. A-347. Dry. TD 1,580 ft.

Sunray Oil Corp. 1 Cowan-McKinney, Sec. 85, Jefferson CSL Sur. Dry. TD 4,770 ft.

Clay County: L. T. Burns 1 Neville, Blk. 23, Orange CSL, Sur. A-368. Dry. TD 6,230 ft.

Tom B. Medders 1-A Morris, BBB&C Sur., Blk. 2. Dry. TD 4,902 ft.

Grayson County: Jake L. Hamon 1 Freeman, D. S. Southmayd Sur., A-1077. Dry. TD 7,044 ft.

Jack County: Marine Production Co. 1 Henderson, I. Hughson Sur. IPF 118.16 BOPD, top pay 4,862 ft., open hole, ¾-in. choke, 44°. TD 4,972 ft. (Oil discovery.)

J. B. Revier et al 1 Jackson, Henry Fuque Sur. A-217. Dry. TD 3,553 ft.

Paul P. Steed et al 1 Cherryhomes, F. Payne Sur. A-1564. Dry. TD 4,750 ft.

Falcon Oil Corp. and Sojourner Drilling Co. 1 Masterson Bros., 8-1-H&GN Sur. Dry. TD 6,587 ft.

Montague County: Osage Exploration Co. 1 Copeland, Blk. 118, G. Bayne Sur. A-17, Belcher Subd. IPP 167.75 BOPD, top pay 6,108 ft., 30.1°. TD 6,167 ft. (Oil discovery.)

Wichita County: C. W. Clark et al 1 Cahoon, Jr., Bryant Brown Sur. 808. Dry. TD 1,625 ft.

Wilbarger County: Jack L. Story et al 1 Milner, Sec. 30, Blk. 9, H&TC Sur. Dry. TD 2,076 ft.

Kouri Oil Co. 2-C Innes McCrary, Sec. 64, Blk. 14, H&TC Sur. IPP 21 BOPD, top pay 1,980 ft., 40°. TD 2,000 ft. (Oil discovery.)

Young County: Joe K. Bailey 1 Reeves, Blk. 1983, TE&L Sur. A-1057. IPF 242 BOPD, 40°, ⅜-in., top pay 2,758 ft. TD 2,767 ft. (Oil discovery.)

C. B. Christie et al 1 Watson, Young CSL, Blk. 22, Sur. A-1284. Dry. TD 3,661 ft.

Wilbert Kunke 2 Harve Henning, TE&L Sur. 65. IPP 41 BOPD, top pay 1,059 ft., 39°. TD 1,061.5 ft. (Oil well.)

J. N. Smith 1-B W. H. Lindsey et al, J. N. Smith Sur. A-1945. Dry. TD 3,229 ft.

John T. Wilson 1 Willis, Blk. 2, SPRR Sur. A-2137. Dry. TD 4,174 ft.

WEST TEXAS

Andrews County: Atlantic Refining Co. 1 University 9 "A," 13-9-Univ. lands. IPF 423 BOPD, 40/64-in., top pay 8,430 ft., 35.5°, GOR 779:1. TD 8,950 ft. (Oil discovery.)

Wilshire Oil Co. 33-16 Cox et al, Sec. 16-A-22-PSL Sur. Dry. TD 10,217 ft. Temp. abd.

Borden County: Double U Oil Co. 1 "A" G. E. Spinnler, 364-Blk. 97-H&TC. Dry. TD 8,376 ft.

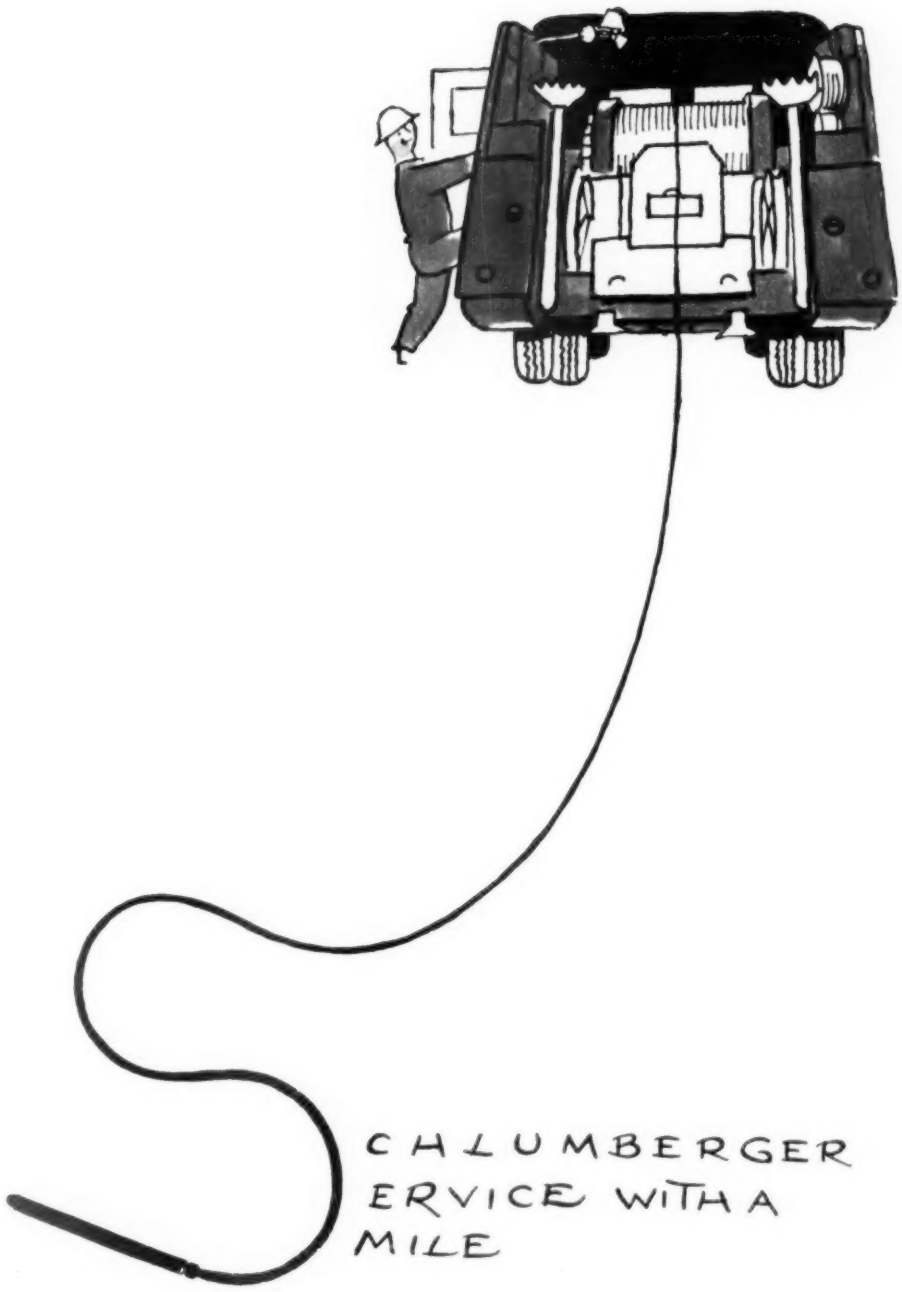
Crockett County: A. W. Cherry 1 M. A. Shannon, 28-BB-EL&RR. Dry. TD 1,640 ft.

John I. Moore and P. D. Moore 1 Shannon Est. "L," Sec. 1, Richard Pillow Sur. Dry. TD 6,760 ft.

Dawson County: Magnolia Petroleum Co. 1 Eiland, Glasscock CSL Sur. Dry. TD 12,350 ft.

Seaboard Oil Co. of Delaware et al 1 Pettaway, 40-34-T-5-N-T&P. IPF 531 BOPD, ¾-in., 40.4°, top pay 7,887 ft., top reef 7,885 ft. TD 8,203 ft. (Oil well.)

Howard County: Texas Pacific Coal & Oil Co. et al 1 Spencer "A," 14-32-T&P. IPF 428 BOPD, 43.5°, top pay 9,860 ft., top Sil. Dev. 9,850 ft. TD 10,092 ft. (Oil well.)



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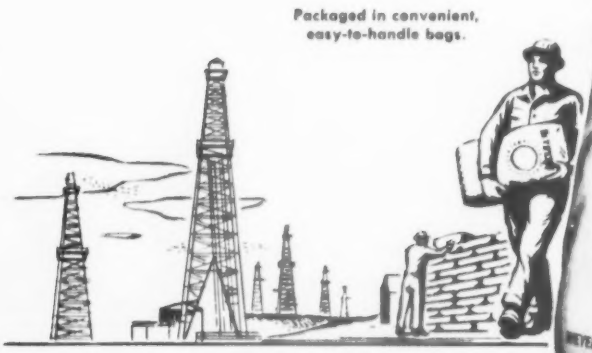

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WILDCAT COMPLETIONS

Loving County: A. A. Cameron 1 T.X.L., 17-54-T&P. Dry. TD 4,503 ft.

Pecos County: Continental Oil Co. 1 Trees et al, 70-8-H&GN. Dry. TD 6,007 ft.

Runnels County: Thos. D. Humphrey & Sons 1 Byers et al, 146-TERR-1277. Dry. TD 3,972 ft.

Geo. W. Strake 1 Gerhart, Wm. Heavenhill Sur. 324. Dry. TD 4,587 ft.

Schleicher County: Ray B. Butler et al 1 Robinson, 82-H-GH&SA. Dry. TD 5,622 ft.

Texas Crude Oil Co. and B. L. McFarlan 1-8 Daughdrill, Lge. 8, A-46, Conchoe City, CSL Sur. Dry. TD 7,564 ft.

Scurry County: Coronet Oil Co. et al 574-1 Browning, 574-97-H&TC. IPF 28 BO/18 hours, 32.8°. TD 8,307 ft., top pay 2,139 ft. (Oil well.)

Upton County: Trebold Oil Co. and Rodman 1 Mayhew, 2-W-GC&SF. Dry. TD 1,820 ft.

Winkler County: Magnolia 1 U-Tex Lease 39854, 11-21-Univ. lands. Dry. TD 8,609 ft.

SOUTHEAST NEW MEXICO

Chaves County: Magnolia Petroleum Co. 1 Shaw-Federal, 6-13s-31e. Dry. TD 12,072 ft. Granite. Ellenburger 11,900 ft.

Eddy County: Stanolind Oil & Gas Co. 1 State AB, 29-17s-28e. IPF 30,000 M.c.f. of gas per day, plus 27 bbl. dist. per million cubic feet. Top pay 10,102 ft. PBTD 10,270 ft. (Gas-distillate discovery.)

Lea County: Continental Oil Co. 1-"Q"-15 State, 15-16-32. 1¾ miles SW of Anderson Ranch field. IPF 501 BOPD, 40/64-in., GOR 564, 37°, top pay 9,849 ft. TD 13,689 ft., perfs. 9,849-69 ft. (Oil discovery.)

Livermore Drilling Co. 1 Moberly, 27-17-38. Dry. TD 5,835 ft.

Lincoln County: Malcom & Morrow 1 Franks, 23-2s-15e. Dry. TD 2,140 ft. Temp. abd.

NORTHERN NEW MEXICO

Rio Arriba County: Delhi Oil-Atlantic Refining 1 Jicarilla, NE SW SW 19-26n-5w. IPF 1,450 M.c.f. per day. Pic. Cliffs 3,100 ft. TD 3,194 ft. (Pic. Cliffs discovery—new field.)

ILLINOIS

Clinton County: Shulman Bros. 2 Farrell, SE SW NE 6-1n-2w. Dry. TD 1,113 ft.

Gallatin County: The Texas Co. 1 Moye unit, NW NE SE 27-7s-9e. Dry. TD 3,089 ft.

B&G Oil Co. 1 Grumbley, NE SE SW 20-7s-9e. Dry. TD 3,108 ft.

Vermillion County: Robert Hurst 1 Bussard, SW NW SE 11-20n-13w. Dry. TD 1,700 ft.

Washington County: Twin Cities Development 1 Doepke, NW SE NE 16-2s-5w. Dry. TD 2,361 ft.

White County: Clark & Clark 1 Cleveland, SE NE NW 16-5s-10e. Dry. TD 3,146 ft.

INDIANA

Daviess County: Frances L. Beard 1 Andis, SE SE NE 3-4n-6w. Dry. TD 1,125 ft.

Dubois County: Olds Oil Co. 1 Schwinhanner, SE SE NE 23-3s-5w. Dry. TD 960 ft.

Gibson County: Bury Drilling Co. Kendle, SE NW NE 15-2s-11w. Dry. TD 2,388 ft.

Pike County: Barron Kidd 1 Rudolph, SE NW NE 23-1n-8w. Dry. TD 1,399 ft.

Spencer County: E. F. Moran 1 Payton, NW SW SE 32-7s-7w. Dry. TD 1,880 ft.

E. F. Moran 1 Hickerson, SW NW NW 4-8s-7w. Dry. TD 1,621 ft.

Sullivan County: Schafer-Granholm 1 Thompson et al, NW NE NE 33-9n-10w. Dry. TD 2,406 ft.

Vigo County: F. B. Cline 1 Green, SW SW NE 35-11n-8w. Dry. TD 1,720 ft.

F. B. Cline 2 White, SE NW SE 15-11n-8w. Dry. TD 831 ft.

KENTUCKY

Daviess County: G. J. Clark et al 1 Howes, SL NE NE SE 3-P-30. Dry. TD 1,745 ft.

Basin Drilling Co.-Kaufman 2 Cauley, EL NW NE NW 19-O-26. Dry. TD 2,416 ft.

Henderson County: Ryan Oil Co. 2 Crafton, WL SE SE NW 9-O-24. IPP 33 BOPD, Jackson 2,044-48 ft. TD 2,052 ft. (Opens Anthoston pool.)

Barron Kidd 1 Eakins, NE SW SE SW 22-O-24. Dry. TD 2,542 ft.

Hopkins County: L. J. Lloyd 1 Bayley, NW NW SE NE 18-I-26. Dry. TD 855 ft.

McLean County: C. E. O'Neal et al 1 Morris, WL NE SW NE 9-M-26. Dry. TD 2,925 ft.

MICHIGAN

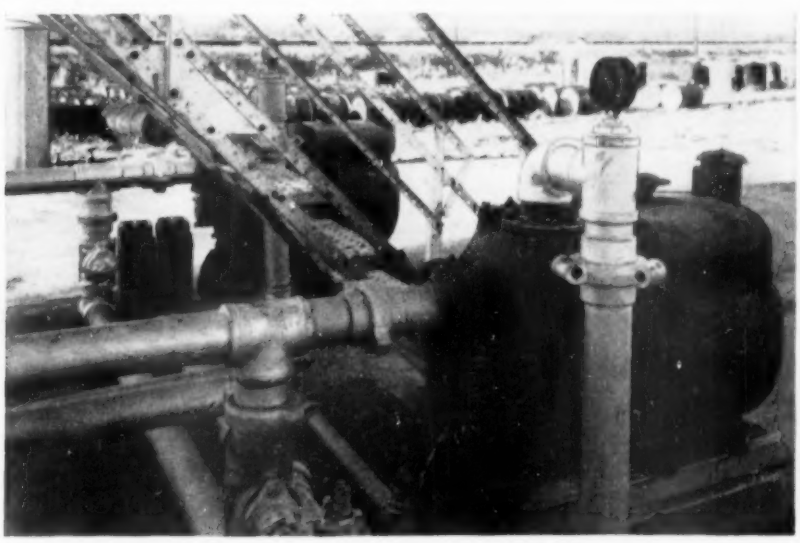
Berrien County: States Oil Co. 1 Zollar, NE NW SE 27-4s-18w. Dry. TD 752 ft. in Traverse lime.

Gratiot County: McClure Oil Co. 1 Mellinger SW SW NW 9-10n-2w. Dry. TD 3,200 ft. in Dundee.

Ionia County: McClure Oil Co. 1 Howk, SW SW NW 19-8n-5w. Dry. TD 2,960 ft. in Dundee.

Oceana County: Lowell Bernhardt 1, Veurink, SE SE NW 12-13n-17w. Dry. TD 2,364 ft. in Dundee.

Ottawa County: Robert W. Devine and J. W.



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Exclusive twin priming advantages give C.M.C. Dual Prime Pumps longer life, minimum maintenance and outstanding operating performance.

They are simple, rugged, fool-proof—and every pump is tested under most severe conditions.

Automatic priming speed on lifts up to 25' is unmatched. Sizes 1½" to 10"—3,000 to 240,000 G.P.H.

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WATERLOO, IOWA

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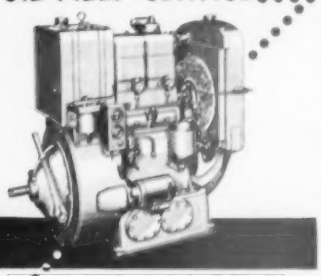

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Compact and simple to operate, Nordberg "4FS" Diesel engines provide dependable power capable of continuous, heavy-duty oil field service. Built in 1, 2 and 3-cylinder models, they develop from 10 to 45 H.P. or 6 to 30 K.W. at *medium speed* for long life. Available in "packaged" generator sets, pumping units and as power units with stub shaft or clutch power take-off.

PROVED IN USE

An oil company has this to say about their Nordberg Diesel power unit after several months of "around-the-clock" operation!

"No mechanical failure has occurred, no repair work of any kind has been necessary, and the engine is apparently in excellent mechanical condition. We are pleased in every respect with the performance of the Nordberg engine and with the service and attention of your distributor."

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Send catalog covering Nordberg Type 4FS Diesels. I am interested in a unit for the following service: OG

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Company Name_____

Address_____

City_____ Zone____ State_____

4-253-O

WILDCAT COMPLETIONS

Lang Co. 1 Stroven, NE SE NE 36-8n-14n. Dry. TD 1,932 ft. in Traverse lime.

Sanilac County: Wm. M. Joy and J. Oliver Black 1 Tomczyk, N WNW NW 35-10n-16e. Dry. TD 4,314 ft. in Niagaran.

Van Buren County: Ford Oil Co. 1 Smith, NE NW SE 6-4s-13w. Dry. TD 1,044 ft. in Traverse lime.

ALABAMA

Escambia County: Durbin Bond & Co. 1 Bozeman, C NW NW 14-1n-6e. Dry. TD 6,818 ft. Elev. 310 ft., lower Cretaceous 6,666 ft.

MISSISSIPPI

Amite County: Sun Oil Co. 1 Chipley Farms, Inc., near C SE SE 19-4n-4e. Dry. TD 7,400 ft.

SOUTH LOUISIANA

Avoyelles Parish: Union Oil Co. of California 2 Hines, 14-4n-4e. Dry. TD 6,511 ft.

Calcasieu Parish: Stanolind Oil & Gas Co. 9 Bright-Pen fee, 28-9s-11w. IP 100 BOPD, ⅛-in., 29.2°, casing perforations 3,703-16 ft. TD 4,346 ft. (New pay in Edgerly field.)

Sun Oil Co. 7 Lutcher-Moore, 2-8s-13w. IP shut-in gas-condensate well (no gage), casing perforations 8,670-8,710 ft. TD 9,753 ft. (New pay in North Starks field.)

Iberia Parish: Cities Service Oil Co. 1 Jeanerette, 33-11s-8e (Fausse Point area). Dry. TD 10,125 ft.

Julius Fohs Driller Group 1 New Iberia Airport, 33-11s-6e. Dry. TD 11,998 ft.

Lafourche Parish: John W. Mecom 5 Green, 2-17s-22e. IP 529 BOPD, 12/64-in., 34.9°, casing perforations 10,252-56 ft. TD 11,707 ft. (New pay in West Delta Farms field.)

Vermilion Parish: Union Oil Co. of California 1 Albritton et al, 14-16s-1e. Dry. TD 12,525 ft. (Pecan Island area.)

NORTH LOUISIANA

Caldwell Parish: Nebo Oil Co. 2 Fee, C NW NW 2-11n-5e. Dry. TD 4,500 ft.

Catahoula Parish: Columbian Carbon Co. 1 Crawford, near NEc SE 29-11n-6e. Dry. TD 5,009 ft. Wilcox 2,507 ft.

Concordia Parish: Norton Oil Co. 2 Madison O&D Co. "C," 5-5n-8e. Dry. TD 6,882 ft.

DeSoto Parish: J. W. Brown et al 2 Harris, C SE NW 6-10n-13w. Dry. TD 2,235 ft. Base Ozan 1,905 ft.

J. W. Brown et al 1 Harris, C NE NE SW 6-10n-13w. Dry. TD 5,250 ft.

Franklin Parish: Carpenter Oil Co. 1 Wright, near SEc SW NE 12-15n-8e. Dry. TD 4,248 ft. Tuscaloosa 3,924 ft.

Winn Parish: E. L. Sauer et al 1 Shirley, C SW SE SE 36-12n-3w. Dry. TD 1,080 ft.

ARKANSAS

Hempstead County: V. S. Parham et al 2 Flowers, Near SWc 17-10s-25w. Dry. TD 2,330 ft.

Union County: Zach Brooks-Asland 1 Williamson, near NWc NE 1-17s-17w. Dry. TD 6,517 ft.

White County: Magnolia Petroleum Co. 8 Core Test, 7-8n-4w. Dry. TD 432 ft.

Magnolia 12 Core Test, 16-8n-4w. Dry. TD 580 ft.

Magnolia 11 Core Test, 17-8n-4w. Dry. TD 709 ft.

Woodruff County: Magnolia 9 Core Test, 2,000 ft. S and 275 ft. E NWc 15-9n-3w. Dry. TD 2,313 ft.

Magnolia 13 Core test, 23-9n-3w. Dry. TD 1,048 ft.

What Moore does a

well digger need?

If he's diggin' in North Central Texas—up Abilene way—the man he needs is Jerry Moore. ★ He stood still long enough for the photographer to shoot that pleasant smile, but he hasn't stopped since. ★ Seems like he's always dashing from here to yonder peddling Web Wilson Tongs and Elevators and Hooks and Links and Spiders and TIGER TOOTH Tong Dies—and **selling** 'em too. ★ S-o-o-o when anyone asks "What Moore do you need?" the answer is G. H. (Jerry) Moore at Wichita Falls 73-744. ★ He gets his mail at Box 1347, if you have any orders for TIGER TOOTH Tong Dies to mail in

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McALLEN or LAFAYETTE, LA.

MOVING DRILLING MUD--*FAST!*

JUST FOR THE record, this moving job during a changeover was timed, and here are the results: Exactly 8 minutes, 33 seconds after the driver yanked up on the emergency brake, 45 bbls., of 12 lb. mud was snugly inside the Thompson Unitized Vacuum Tank!

TO THE NEXT HOLE

From there to the next hole was discounted as driving time. Starting the stop watch again when the driver had backed up to the shaker pit, the one man laid hose, opened the valve and had the tank empty in 4 minutes, 10 seconds.

GET ALL THE FACTS

There's a Thompson Unitized Vacuum Tank built to do your jobs fast, too! Cleaning tanks, draining sumps, pumping out cellars, agitating mud, spraying roads, weeds, etc., are everyday chores for this workhorse.

Send for your copy of the new Specifications Report; 10 illustrated pages, packed with information. It's yours for the asking by return mail.

This Thompson UVT moved 45 bbls. of 12 lb. mud from one drillsite to the other (not counting driving time) in 12 minutes, 43 seconds! If you have a mud-moving problem, check Unitized Vacuum Tanks; 20-100 bbls. capacity; truck, trailer, semi-trailer or skid mounted.

SOLE LICENSEE TO MANUFACTURE VACUUM TANKS UNDER U. S. PAT. NO. 2522077

In South America—International Gas Lift, S. A., Caracas, Venezuela

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Tank & Manufacturing Co., Inc.
2019 East Wardlow Road, Long Beach 7, California

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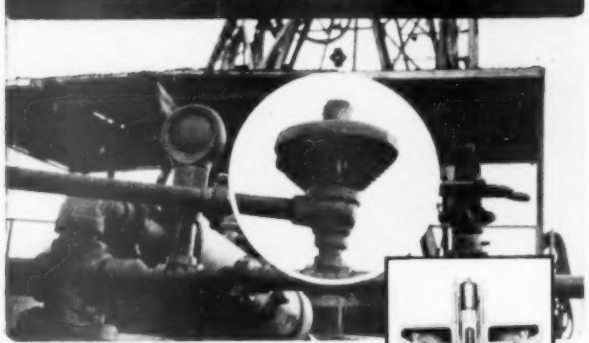

Kinzbach Model 112 Relief Valve shown in closed position.

The Kinzbach Model 112 Relief Valve provides safer, more efficient pump or pressure relief and greater flexibility in operations than any other valve. It **snaps open** for instant pressure relief at maximum volume and **snaps shut** to restore circulation instantly and automatically after a predetermined pressure drop. The basic design positively prevents chatter.

Available in 2" and 3" sizes. Write for full technical data. Ask for bulletin 11250.

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A **NEW** **MURPHY SAFETY SWITCH** FOR **SURE** **FULLY AUTOMATIC ENGINE PROTECTION**

model *O-27D*

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Stops Engine AUTOMATICALLY when Oil Pressure Falls . . .

- Visible contacts and pressure gauge on one face
- See it work — you know it's working all the time
- Easy to install
- Simply screw into oil pressure line or on block. Run wire to magneto ground terminal.

GUARANTEED FOR ONE FULL YEAR

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WILDCAT COMPLETIONS

OKLAHOMA

Carter County: Seaboard Oil Corp. 1 Smith "A," SE SW NE 9-3s-1w. Dry. TD 8,111 ft.

Coal County: Twin Oil Corp. 1 Cody, C SW SW 27-2n-9e. IPF 199 BOPD, Oil Creek 6,882-92 ft., 42°, ⅛-in. TD 7,003 ft. (New pay and geological wildcat in Centrahoma pool.)

Cotton County: Baldwin 1 Day, W½ W½ NW NE 23-5s-13w. Dry. TD 1,826 ft.

Garfield County: Delany Drilling Co. 1 Cline, SE SW NE 22-20n-4w. IPF 26 BOPD, Layton sand 4,620-24 ft., ½-in., 40°. TD 6,296 ft. (Oil discovery.)

Garvin County: Sohio Petroleum Co. 1 Moore, SW SE NW 20-1n-2w. Dry. TD 5,189 ft.

Superior Oil Co. 1 Reeves, C SE SW 21-4n-4w. IPF 7 BOPD, 8,286-8,411 ft., Hart sand, 44°, 28/64-in. TD 9,716 ft.

Grant County: Union Oil Co. of California-Sun Oil Co. 1 Simpson, NE NE SE 29-29n-6w. IPF 310 BOPD, Simpson 5,256-76 ft., 44.6°, ½-in. TD 5,278 ft. (Opens North Jarvis pool).

Hughes County: Pure Oil Co. 1 Scullion, SW NW SE 3-4n-11e. Dry. TD 7,300 ft.

Jackson County: Ben Russell 1 McWhorter, SE NE NW 25-2n-19w. Dry. TD 1,580 ft.

Kay County: Wilcox Oil Co. 1 Hron, SE NE NW 26-25n-2e. Dry. TD 3,965 ft.

Service Drilling Co. 1 Boles, NE NE NE 28-28n-5e. Dry. TD 3,583 ft.

Lincoln County: The Texas Co. 2 Frost, SW NW NW 18-12n-3e. IPP 71 BOPD, Simpson dolomite 5,472-98 ft., 36°. TD 5,580 ft. (Oil discovery.)

Athens 1 Erwin, NE NE SW 29-15n-2e. Dry. TD 5,364 ft.

Logan County: E. K. Carey et al 1 Polsley, SE SE NE 1-19n-4w. Dry. TD 6,215 ft.

Murray County: Mack Dyer 1 Dyer, N½ NW NE NE 12-1n-3e. Dry. TD 485 ft.

Noble County: Sooner State Oil Co. 1 Huff, SW SW NW 17-24n-1w. Dry. TD 4,343 ft.

Oklahoma County: Ashland Oil & Refining Co.-Mitchell 1 Wasik, SW SE SE 1-12n-1e. Dry. TD 5,597 ft.

Payne County: Ketchum-Whan Drilling Co. 1 Correll, SW NW NE 15-19n-1e. Dry. TD 5,919 ft.

The Texas Co. 1 Wirt, NW NW NE 23-19n-1e. Dry. TD 4,968 ft.

Davon Oil Co. 1 Bode, NW SW NW 14-19n-1w. By heads 52 BOPD, 1st. Wilcox 4,959-75 ft., 12/64-in., 40°. TD 5,084 ft.

Pittsburgh County: Public Service Co. of Oklahoma 1 Rooke, C NW SE 7-5n-12e. Dry. TD 3,184 ft.

Pontotoc County: Wm. H. Pine 1 Searcy, SE NW SW 16-3n-8e. Dry. TD 1,511 ft.

John H. Stapleton 1 Norris-Law, SE SE NE 11-4n-4e. IPP 5 BOPD, 1,710-25 ft., 40°. TD 2,299 ft. (Oil well).

Roger Mills County: Carter Oil Co. et al 1 Hartley, NE NE NW 34-14n-26w. Dry. TD 12,384 ft. Deese 10,925 ft.

KANSAS

Finney County: Lauck 1 Graves, SE NE NE 16-22s-33w. IPP 147 BOPD, Mississippi 4,639-49 ft. TD 4,802 ft. (Opens Damme Northeast pool.)

Kingman County: Cities Service 1 Lampe, NE NE NW 27-27s-6w. Dry. TD 4,351 ft

Kiowa County: Southwest Exploration-GMR 1 Heath, SE SW SE 20-28s-16w. Dry. TD 5,092 ft.

McPherson County: National Associated 1 Goering, NE NE NE 16-20s-2w. Dry. TD 3,028 ft.

Meade County: Skelly Oil Co. 1 Hanson, SW SW NE 2-35s-28w. Dry. TD 6,617 ft. St. Gen. 6,513 ft.

Norton County: Harry Gore 1 Hershiser, SE SE SE 34-3s-23w. Dry. TD 3,814 ft.

Jones-Shelburne & Farmer 1 Damewood, NE NE NE 29-5s-21w. Dry. TD 3,682 ft.

Pawnee County: Musgrove 1 Caston, NE NE NW 26-21s-18w. Dry. TD 4,080 ft.

Rawlins County: Natural Gas & Oil 1 Lewis, SW NW NE 21-3s-32w. Dry. TD 4,837 ft. Arbuckle 4,684 ft.

Rice County: Rich-Hurd 1 Gamkee, NE NE SE 32-21s-7w. Dry. TD 3,460 ft.

Rooks County: Trans-Era 1 Oliva, NE NE SW 4-7s-17w. Dry. TD 3,320 ft.

Sedgwick County: Brack 1 Siggs, NW SW NE 20-27s-2w. Dry. TD 4,230 ft.

Stafford County: Amerada Petroleum Corp. 1 Ellinwood Hunting Club, NW SE SE 33-21s-11w. Dry. TD 3,485 ft.

NEBRASKA

Cheyenne County: Pioneer Oil Corp. 1 State, NW SW SW 16-13n-51w. Dry. TD 4,984 ft. "J" sand 4,940 ft.

Kimball County: Eddie Fisher 1 Gross, NW NW SE 3-4n-56w. Dry. TD 6,629 ft. "J" sand 6,519 ft.

NORTH DAKOTA

Stark County, Daglum Buttes: Plymouth Oil Co. 1 Frank A. Fischer, C SW NE 11-137n-98w. Dry. TD 10,480 ft. Jefferson 10,225 ft.

CALIFORNIA

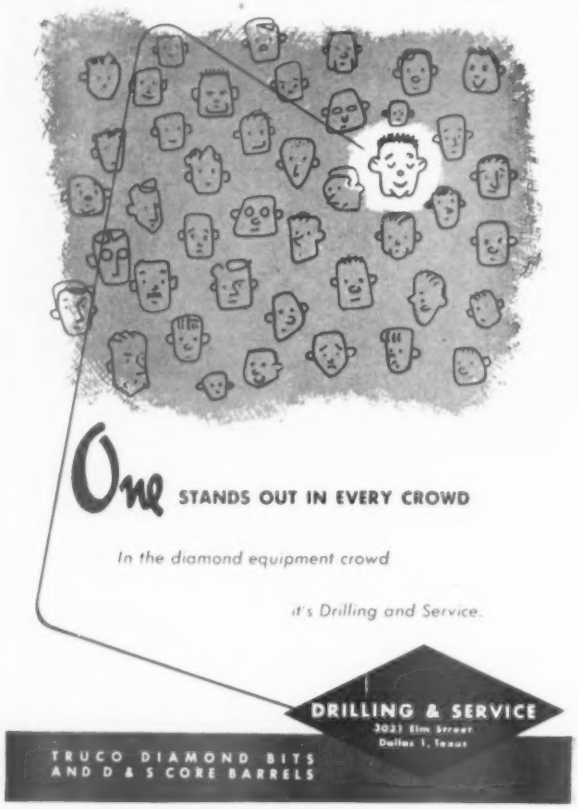
Kern County: R. S. Rheem, Oper. 1 Ambrose, 26-26s-17e. Dry. TD 1,453 ft.

Intex Oil Co. 4 E. P.-U. S. L., 4-29s-20e. Dry. TD 1,545 ft.

Sacramento County: H. L. Alexander & G. J. Homan 1 Howard, 24-6n-7e. Dry. TD 2,659 ft.

THE OIL AND GAS JOURNAL

"Men are so utterly disgusting—all this because they hit oil—that's what they were drilling for, wasn't it?"



WILDCAT COMPLETIONS

San Benito County: Donald Frankel, Oper. 1 Lewis-U. S. L., 34-16s-12e. Dry. TD 2,241 ft.

Santa Barbara County: Wilrich Development Co. 2 Richardson, 13-10n-28w. Dry. TD 1,663 ft.

Sutter County: Richfield Oil Corp. 1 Butte Comm.-D, 15-16n-1e. Dry. TD 7,242 ft.

Ventura County: Union Oil Co. 21 Simi core hole, 18-3n-18w. Dry. TD 4,134 ft.

MONTANA

Golden Valley County, Womans Pocket Area: Ashland Oil-Zach Brooks 1 NPRR, C SE SE 29-8n-21e. Dry. TD 4,700 ft. Cambrian 4,481 ft.

McCone County, Sunnyside: Continental-Delhi-Mon-Dak 1 George Good, NE NE SE 21-26n-49e. Dry. TD 9,530 ft. Red River 9,192 ft.

Sanders County, Hot Springs: Premier Petroleum 1 Bartlett, SW SW SW 15-20n-24w. Dry. TD 2,007 ft. Pre-Cambrian 210 ft.

Dawson County, Woodrow: The Texas Co. 1 NPG (NCT-8), C NE NE 7-16n-54e. IPF 85 BOPD. Madison 8,043 ft. TD 8,124 ft. PB 7,916 ft. (Charles discovery—new field.)

WYOMING

Big Horn County: General American Oil 2-T Government, NE SE SE 17-49n-91w. IPF 33 BOPD Tensleep 4,172 ft. (Tensleep discovery—new field.) TD 4,172 ft.

Paint Rock Anticline: Christiana Oil Corp. 1 Government, SE Tr. 85-F (SW NW of 18) 49n-90w. Dry. TD 1,802 ft. Tensleep 1,699 ft.

Johnson County, Case Ranch: British-American 2 Government-Case, NE SW SW 9-47n-82w. Dry. TD 5,247 ft. Tensleep 5,192 ft.

COLORADO

Grand County, Granby Anticline: C. G. Glasscock Drilling Co. 1 Horn, SE SE NW 31-2n-76w. Dry. TD 5,606 ft. Morrison 5,327 ft.

Murphy Corp. & Ashland Refinery 1 Woodward Malloy, SE SE NE 5-4n-56w. Dry. TD 5,576 ft. Skull Creek 5,570 ft.

Morgan County: Cheyenne Oil Ventures & Mendota Oil 1 Fee, C SW SW 29-4n-59w. Dry. TD 6,215 ft. "J" sand 6,177 ft.

El Paso County: Core Hole, Shell Oil Co. 2 Berry Hill, SE NW NW 32-11s-67w. Dry. TD 569 ft.

Sedgwick County: Stanolind Oil & Gas Co. 1 Johnson, SE NE SE 22-11n-45w. Dry. TD 3,659 ft. Skull Creek 3,651 ft.

Washington County: Lion Oil Co. 1 Stites, SW SW NE 17-1s-56w. Dry. TD 5,605 ft. "M" sand 5,580 ft.

ALBERTA

Cal-Standard 10-11 Bentley, LSD 10, 11-40-2w5. Dry. TD 9,115 ft.

Gulf-CPR. 9 Rich, LSD 9, 7-35-21w4. Basal quartz gas well. TD 6,993 ft. PBTD 4,905 ft.

Amurex 2-7 Tanner, LSD 7, 6-20-9w4. Dry. TD 3,442 ft.

Texaco-McColl 1-A Falun, LSD 14, 24-45-27w4. Dry. TD 7,295 ft.

Cal-Standard 10-4 Forshee, LSD 10, 4-42-1w5. Dry. TD 8,640 ft.

Imperial 11-30 Provost, LSD 11, 30-36-2w4. Viking sand gas well. TD 2,796 ft.

Texaco 1-A Purple Springs, LSD 8, 26-10-15w4. Dry. TD 3,175 ft.

Western-Dome 20-3 Craig Lake, LSD 3, 20-34-11w4. Dry. TD 3,642 ft.

SASKATCHEWAN

Great Western 1 Palmer Development, LSD 2, 16-9-6w2. Dry. TD 4,295 ft.

Tide Water-Herbert 1 Crown, LSD 4, 30-18-9w3. Dry. TD 3,675 ft.

British-American-Husky-Phillips 1 Hyde, LSD 12, 28-19-7w2. Dry. TD 2,376 ft.

Amurex-Canada Southern 1-4 Crown, LSD 4, 36-11-26w3. Dry. TD 3,901 ft.

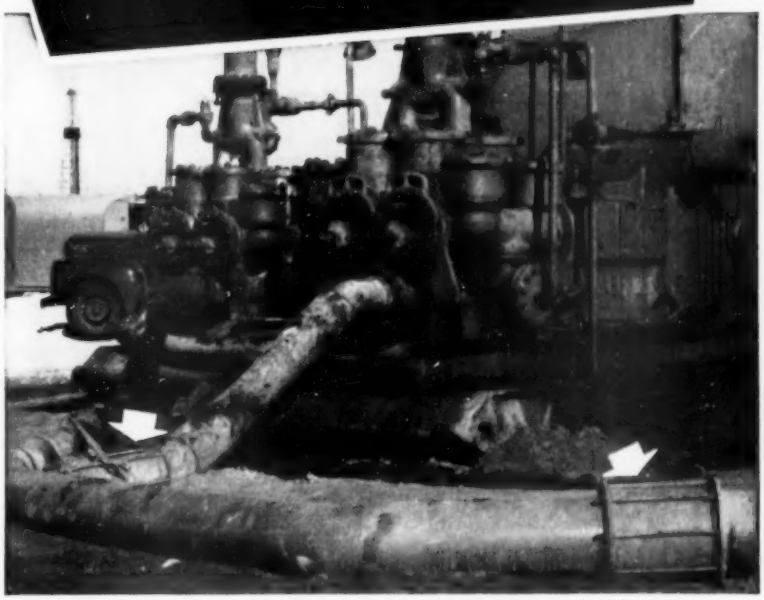
Socony-Sohio 1 Roe, LSD 5, 28-5-21w2. Dry. TD 6,780 ft.

Imperial-Tide Water 12-16 Strongfield, LSD 12, 16-26-4w3. Dry. TD 5,840 ft.

Shell 10 Wood Mountain, LSD 2, 24-1-6w3. Dry. TD 3,113 ft.

"Bensom, you're fired—er, that is, when we get back to th' plant."

MIGHTY HANDY...to have around a drilling rig



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Dressers make quick, dependable connections; use Long Sleeves to span gaps. No pipe threading is necessary and the only tool you need is a wrench. Dressers are that simple to join . . . yet you get a permanent "Flexible-Tight" connection every time, even on offset or deflected pipe.

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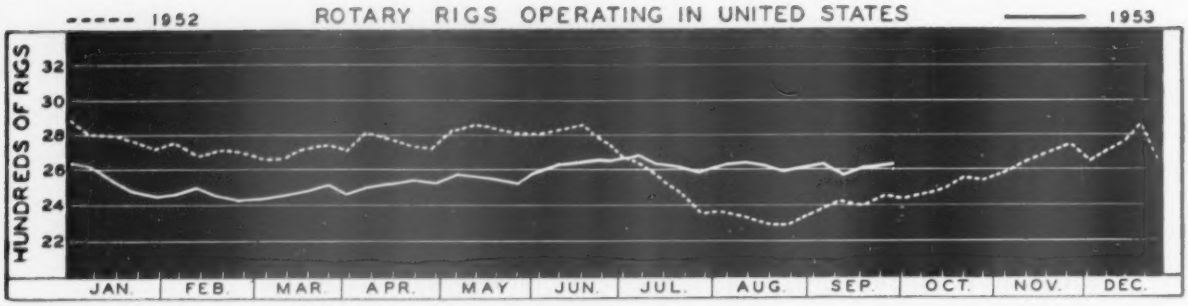
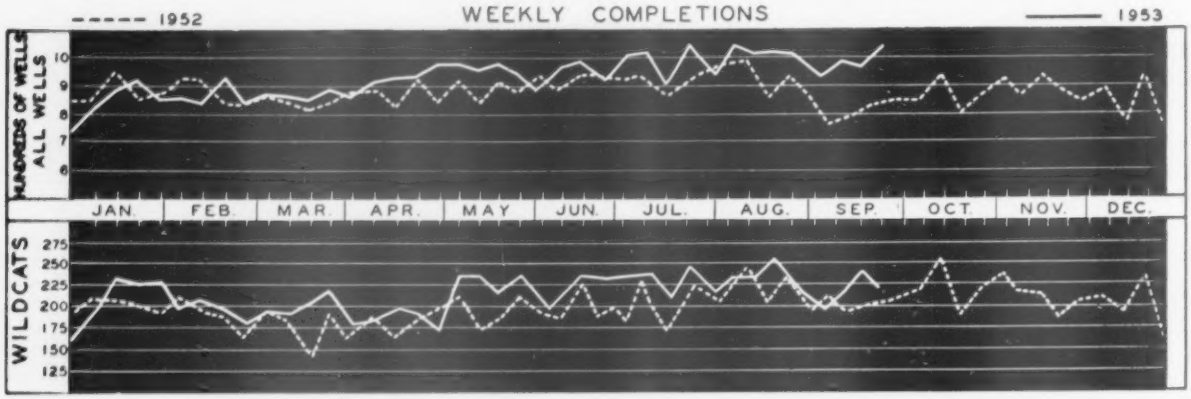




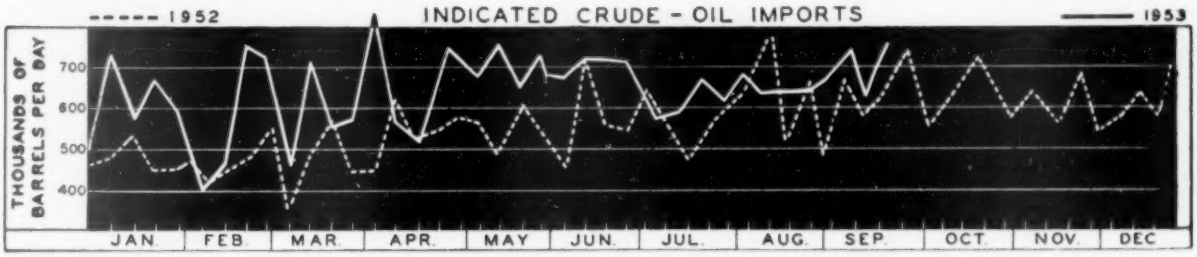
CURRENT STATISTICS

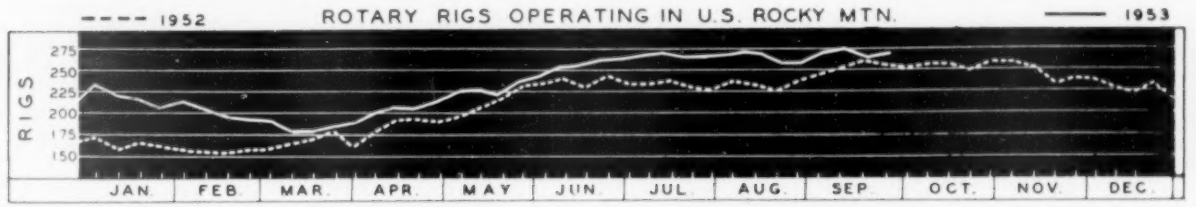
EXPLORATION

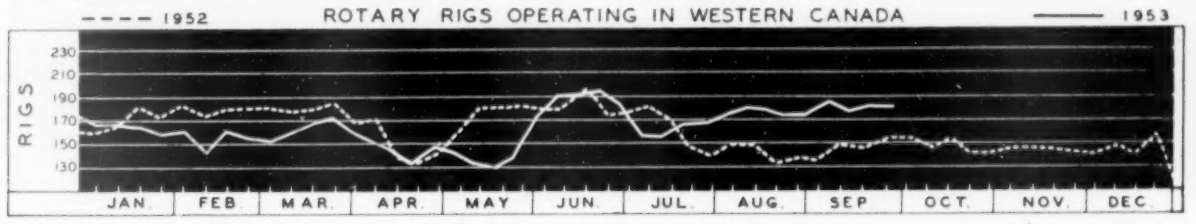
WEEKLY WELL COMPLETIONS . . . WEEK ENDED SEPTEMBER 26, 1953

	Total of all wells					Sept. 26		Wildcat completions and discoveries					Cumulative total, 1953				
	Comp.	Oil	Gas	Dry	Footage	1953	1952	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	17	8	0	*9	24,600	554	599	0	0	0	0	0	0	0	0	0	0
Pennsylvania	45	20	4	†21	90,200	1,384	1,474	0	0	0	0	0	0	0	3	11	14
West Virginia	15	5	9	1	38,618	459	439	0	0	0	0	0	0	0	9	4	13
Ohio	27	13	3	‡11	56,740	774	755	0	0	0	0	0	2	0	3	13	18
Indiana	24	10	0	14	36,842	965	925	0	0	0	9	9	11	0	2	262	275
Kentucky	24	11	0	13	48,168	824	951	1	0	0	5	6	8	0	1	141	150
Illinois	46	29	0	17	117,029	1,433	1,515	0	0	0	6	6	5	0	0	302	307
Michigan	11	2	0	9	23,009	438	522	0	0	0	7	7	12	0	5	181	198
Kansas	96	39	9	§48	345,746	3,577	3,392	1	0	0	12	13	74	0	30	565	669
Nebraska	5	3	0	2	28,013	248	212	0	0	0	2	2	14	0	4	106	124
Oklahoma	189	114	14	¶61	634,152	5,439	4,236	7	0	0	17	24	94	6	26	470	596
Texas	328	180	26	122	1,565,585	12,624	13,130	19	2	2	80	103	663	45	136	3,110	3,954
North Central (Dist. 7-B & 9)	126	73	3	50	420,326	4,751	4,205	10	0	1	30	41	345	0	15	1,254	1,614
West (Dist. 7-C & 8)	62	42	1	‡19	381,822	2,745	4,021	4	0	0	13	17	138	2	12	497	649
Panhandle (Dist. 10)	19	8	8	3	67,963	580	515	0	0	0	0	0	0	2	0	15	17
Eastern (Dist. 5 & 6)	15	3	3	9	91,099	581	606	2	0	1	7	10	17	2	5	205	229
Gulf Coast (Dist. 2 & 3)	50	27	5	18	351,820	1,866	1,980	3	1	0	12	16	85	18	55	491	649
Southwest (Dist. 1 & 4)	56	27	6	23	252,555	2,101	1,803	0	1	0	18	19	78	21	49	648	796
Louisiana	51	28	2	21	291,625	1,927	1,691	2	1	0	11	14	59	27	17	268	371
Northern	29	13	2	14	93,730	802	904	0	0	0	7	7	7	2	2	104	115
Southern	22	15	0	7	197,895	1,125	787	2	1	0	4	7	52	25	15	164	256
Arkansas	23	7	0	16	68,063	392	289	0	0	0	8	8	11	0	0	88	99
Mississippi	8	5	0	3	58,016	268	265	0	0	0	1	1	12	1	4	125	142
Southeastern States	1	0	0	1	6,818	107	50	0	0	0	1	1	1	0	0	88	89
Montana	12	6	0	6	52,781	303	211	1	0	0	3	4	12	0	0	75	87
Wyoming	22	18	0	4	110,328	538	486	1	0	0	2	3	18	0	1	96	115
Colorado	11	3	0	8	55,985	504	321	0	0	0	6	6	22	0	9	224	255
Utah	0	0	0	0	0	50	53	0	0	0	0	0	2	0	4	28	34
New Mexico	42	12	21	9	246,443	1,018	777	1	1	1	3	6	16	1	11	92	120
California	46	35	2	9	179,472	1,878	1,789	0	0	0	7	7	47	0	8	421	476
North Dakota	2	1	0	1	18,912	188	69	0	0	0	1	1	7	0	0	47	54
Miscellaneous	0	0	0	0	0	57	86	0	0	0	0	0	1	0	3	37	41
Total United States	1,045	549	90	406	4,097,145	35,949	34,237	33	4	3	181	221	1,091	80	276	6,754	8,201
Total previous week	963	516	51	396	3,955,693			34	3	3	201	241	1,058	76	273	6,573	7,980
Total September 27, 1952	857	400	66	391	3,455,097			22	3	4	181	210	1,032	66	186	6,301	7,585

Service wells included: *9, †16, ‡1, §4, ¶2.



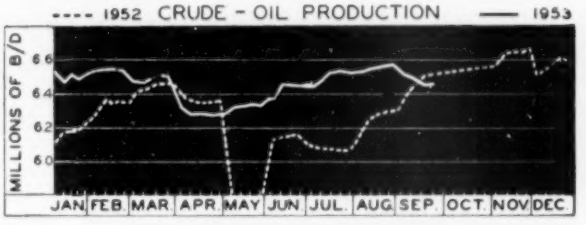


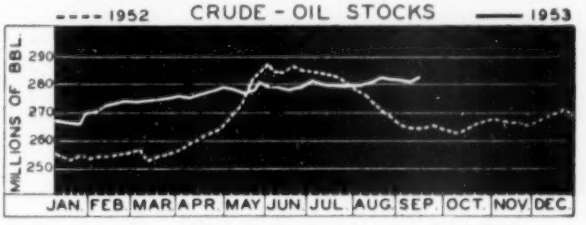


DAILY AVERAGE PRODUCTION FOR WEEK

	September 26 Crude oil	Lease condensate	Total	Sept. 19 total
Alabama	5,200		5,200	5,200
Arkansas	78,250	450	78,700	77,850
California	1,002,100		1,002,100	1,002,900
Colorado	117,500		117,500	116,100
Eastern	59,200		59,200	59,200
Florida	1,525		1,525	1,525
Illinois	165,200		165,200	167,800
Indiana	34,300		34,300	35,000
Kansas	327,300		327,300	319,600
Kentucky	31,700		31,700	31,400
Louisiana	662,525	38,600	701,125	701,075
North	106,000	2,600	108,600	108,550
South	556,525	36,000	592,525	592,525
Michigan	32,300		32,300	32,500
Mississippi	92,800	3,450	96,250	96,100
Montana	31,400		31,400	31,000
Nebraska	14,900		14,900	15,800
New Mexico	200,650	550	201,200	201,300
Oklahoma	544,800		544,800	546,100
Texas	2,736,150	45,000	2,781,150	2,781,150
Dist. 1	39,575	350	39,925	39,925
Dist. 2	149,500	5,500	155,000	155,000
Dist. 3	444,500	22,800	467,300	467,300
Dist. 4	258,000	5,700	263,700	263,700
Dist. 5	48,250	400	48,650	48,650
Dist. 6	126,975	4,900	131,875	131,875
East Texas field	252,000		252,000	252,000
Dist. 7-B	116,675	50	116,725	116,725
Dist. 7-C	161,200	4,200	165,400	165,400
Dist. 8	875,950	700	876,650	876,650
Dist. 9	188,525	350	188,875	188,875
Dist. 10	75,000	50	75,050	75,050
Utah	5,200		5,200	5,000
Wyoming	214,100		214,100	212,000
North Dakota	13,700		13,700	13,900
Total U. S.	6,370,800	88,050	6,458,850	6,452,500
Change from previous week, up			6,350	
Canada	295,425		295,425	282,575
Total U. S. production January 1-September 26			1,736,675,575 bbl.	
Same period last year (crude plus cond.)			*1,663,587,250 bbl.	

*Includes 23,125,935 bbl. condensate.



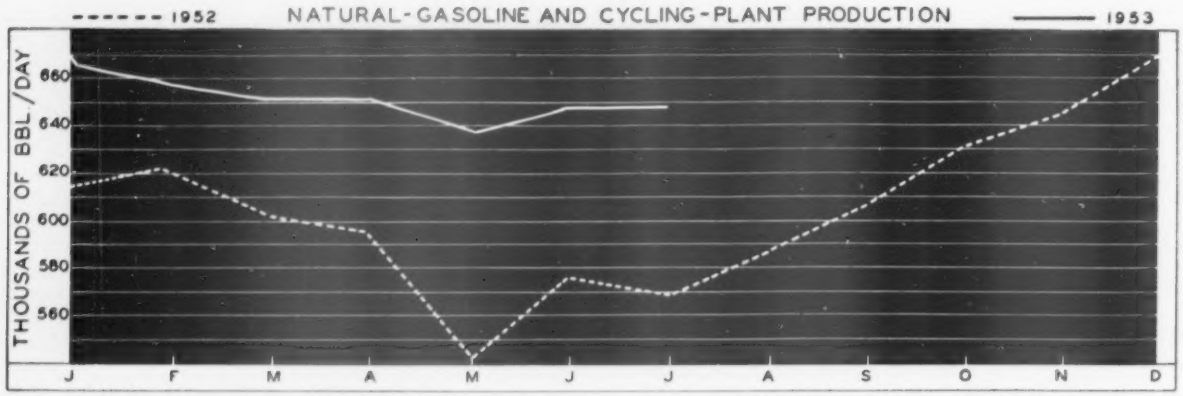


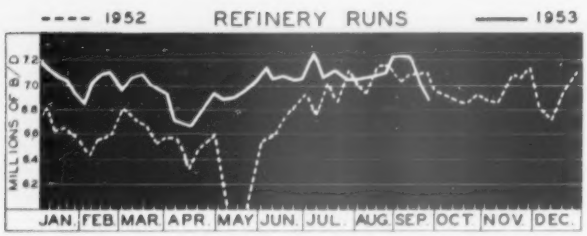
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

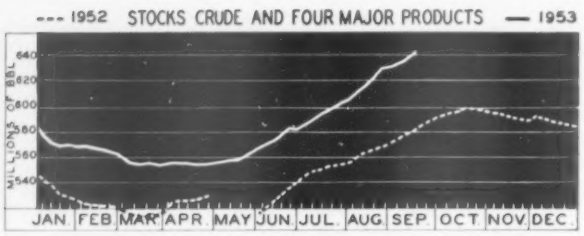
(Thousands of barrels)

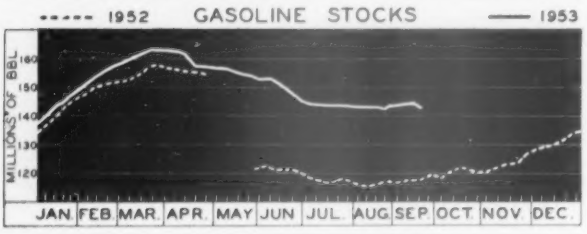
	Sept. 19, '53	Sept. 12, '53	Sept. 20, '52
Pennsylvania Grade	2,729	2,749	2,313
Other Appalachian	2,256	2,411	2,046
Illinois, Indiana, Michigan	12,140	11,780	12,170
Arkansas	3,057	2,924	3,065
Louisiana	16,768	16,955	16,511
North	2,731	2,760	2,257
Gulf	14,037	14,195	14,254
Mississippi	3,686	3,583	3,497
New Mexico	9,638	8,654	7,202
Oklahoma and Kansas	41,644	41,289	38,787
Texas	131,265	130,852	126,656
East Texas	11,030	11,062	13,183
West Texas	59,490	58,330	57,207
Texas Gulf	28,008	27,985	25,943
Other Texas	32,737	33,475	30,323
Rocky Mountain	16,821	16,836	14,757
California	33,248	‡32,793	30,399
Foreign	†10,325	‡10,039	7,063
Total	283,577	280,865	264,466

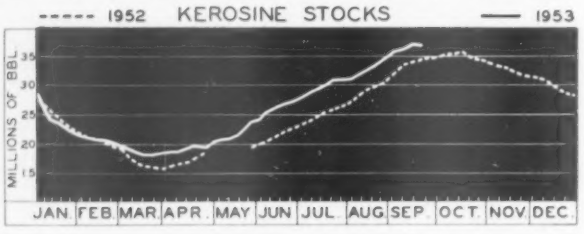
*Bureau of Mines. †Incl. 2,916,000 bbl. in California. ‡Revised.

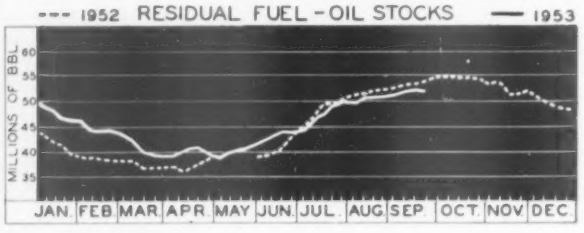










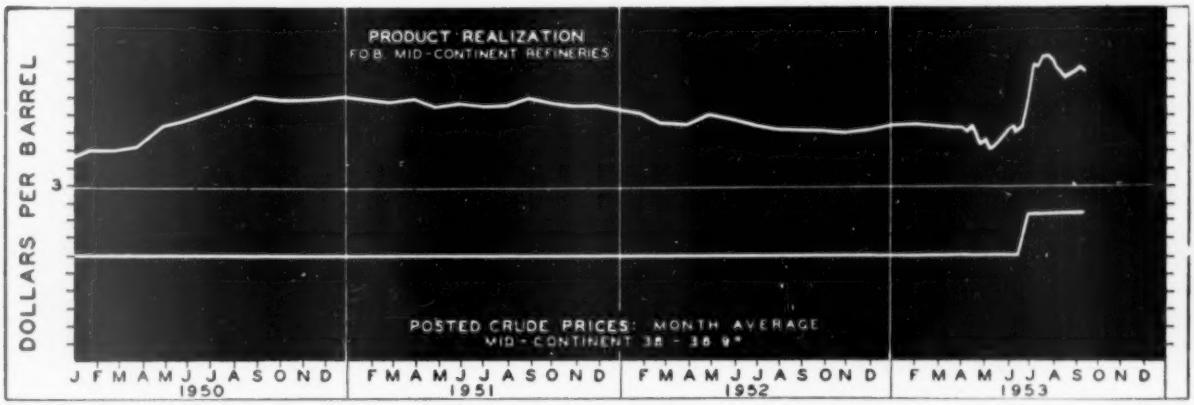


A.P.I. REFINERY REPORT, SEPTEMBER 26

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, September 1952 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,058	401.0	43.0	227.2	203.3	33,442	14,895	45,347	13,957	1,079	437.0	50.6	257.4	223.4
Appalachian:														
District 1	97	44.1	3.8	19.4	7.6	3,761	610	1,434	695	114	46.8	6.0	17.3	12.2
District 2	78	48.6	6.4	13.7	12.3	1,624	606	619	153	79	41.0	3.0	12.7	16.6
Ind., Ill., Ky.	1,224	691.7	65.0	202.2	146.8	28,134	9,337	22,247	4,619	1,283	704.2	71.3	238.2	158.7
Okla., Kans., Mo.	558	326.1	11.3	124.3	44.1	15,112	2,632	12,755	1,118	576	335.1	14.7	138.1	56.4
Inland Texas	243	177.9	11.3	50.1	28.3	5,717	651	2,315	1,490	256	183.1	11.7	45.0	37.9
Texas Gulf Coast	1,647	819.6	117.6	392.3	251.3	18,528	4,222	15,743	6,928	1,729	815.6	123.4	414.5	267.1
La. Gulf Coast	518	277.2	60.3	120.0	33.1	8,036	2,558	7,475	1,495	508	256.1	50.1	140.9	56.8
N. La. and Ark.	85	35.9	5.7	18.0	7.6	3,060	696	708	111	87	36.3	7.2	21.4	6.7
Rocky Mountain:														
New Mexico	20	12.4		2.9	3.9	154		35	29	16	10.4	0.6	2.5	3.4
Other Rocky Mt.	268	127.4	3.0	56.7	48.1	4,539	302	2,862	1,039	246	117.8	5.9	46.9	44.2
California	1,084	454.7	10.0	167.1	365.3	20,377	415	14,677	20,302	1,044	444.9	5.4	166.9	346.2
Sept. 26, 1953	6,880	3,416.6	337.4	1,393.9	1,151.7	142,484	36,924	126,217	51,936	7,017	3,428.3	349.9	1,501.8	1,229.6
Sept. 19, 1953	6,992	3,526.7	306.4	1,400.6	1,218.4	143,740	37,358	126,189	52,164					
Sept. 27, 1952	6,987	3,365.9	376.3	1,457.7	1,262.1	120,276	34,989	114,727	54,583					

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit, and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
J F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952
F M A M J J A S O N D
1953

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.65 for week ended September 19, $3.68 for previous week, and $3.32 for September 1952. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of September 30, 1953. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline	11.125-11.625	13-13.8	11.25-11.75
Premium gasoline	12.25-12.875	14.5-14.8	12.25-12.75
42-44 w.w. kerosine	8.875-9.25	10.15-10.4	9-9.5
No. 2 straw fuel oil	7.875-8.25	9.15-9.4	8-8.5
No. 6 residual	$1.10-1.25	$2.15-2.40	$1.80-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	6.375	5.875	6.125
Grade 18-55	7.65	7.15	7.40

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13.75
750 vis., No. 3-4 neutral	16.75
2,000 No. 5-6 neutral	18-18.75

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	20.5-21.5
200 vis, No. 3 neutral, 0-10 pp.	14.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	25.5
180 vis., 10 p.t. neutral	27.5

WAX

Mid-Continent

132-134 A.M.P.	6.0

GASOLINE markets continue soft in all areas, but with a few reports indicating that the condition in District 2 is slightly better at pipe-line terminals. However, unless demand continues at a high level, gasoline stocks may tend to flood available storage space at Mid-Continent refineries.

The actual and apparent improvement at pipe-line terminals has been due to seasonal changes. Pipe-line tenders of gasoline have decreased rapidly since Labor Day, replaced by increased shipments of light fuels. Also, some of the low prices reported for gasoline at terminals during the latter part of the motoring season were actually not quite as low as the quotations indicated. Sales at terminals were for metered gallons while shipments were on corrected gallons. By the end of September, loading temperatures at some of the northern terminals were down to about 60°, leaving no volumetric gain for the supplier who shipped or bought on a corrected basis and sold metered gallons. The result has been that less material has been reported available at 11.125 cents per gallon plus pipe-line charges.

Some suppliers have reported increases in the movement of distillate fuels but in most cases the gains are admittedly smaller than expected. Current market conditions indicate that it will take a period of cold weather to bring prices in the upper East Coast back to present postings plus the 0.5 cent summer discount.

Tanker rates are still abnormally low. With distillate fuels readily available on the Gulf Coast, light fuels can be delivered in New York Harbor at less than the current prevailing posting of 9.15 cents for barge deliveries of No. 2 fuel. This price is with the 0.5 cent discount that was scheduled to expire at the end of September. Some material was reported available in the last week of September at 8.9 cents.

CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.*	Oklahoma, Kansas	Gulf Coast Tex.†	West Tex.‡
14-14.9	$1.87			
15-15.9	1.93			
16-16.9	1.99			
17-17.9	2.05			
18-18.9	2.11			
19-19.9	2.18			
20-20.9	2.24	$2.50		$2.37
21-21.9	2.30	2.52		2.39
22-22.9	2.37	2.54		2.41
23-23.9	2.45	2.56		2.43
24-24.9	2.53	2.58	$2.91	2.45
25-25.9	2.61	2.60	2.93	2.47
26-26.9	2.69	2.62	2.95	2.49
27-27.9	2.76	2.64	2.97	2.51
28-28.9	2.83	2.66	2.99	2.53
29-29.9	2.91	2.68	3.01	2.55
30-30.9	2.97	2.70	3.03	2.57
31-31.9	3.04	2.72	3.05	2.59
32-32.9	3.12	2.74	3.07	2.61
33-33.9		2.76	3.09	2.63
34-34.9		2.78	3.11	2.65
35-35.9		2.80	3.13	2.67
36-36.9		2.82	3.15	2.69
37-37.9		2.84	3.17	2.71
38-38.9		2.86	3.19	2.73
39-39.9		2.88	3.21	2.75
40 and above		2.90	3.23	2.77

*Standard Oil Co. of California. †Upper Texas Gulf Coast. ‡Includes New Mexico Permian.

Prices East of California effective June 15, 1953. California prices effective February 16, 1953. Pennsylvania Grade prices effective September 21, 1953.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

Louisiana:	
Cotton Valley (distillate)	$3.00
Cotton Valley (Holloway crude)	2.95
Texas:	
East Texas	2.90
Chapel Hill	2.83
Conroe	3.13
Van	2.73
Pennsylvania Grade:	
Bradford	4.05
Southwest Pennsylvania	3.61
West Virginia	3.55
Ohio	3.54
Illinois Basin	3.02

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5395 FT. 4½" O.D. 16.60# National Tube Grade "D" Drill Pipe, with Hughes Flash-weld Hard-faced Joints. Mill shipment price. Immediate delivery at Midland, Tex., yard. Mid-Union Drilling Corporation, 624 South Cheyenne, telephone 4-8163, Tulsa, Oklahoma.

FOR SALE—ELI Model M-6 portable drilling rig on GMC Truck. Ideal for water wells. Will consider good spudder as trade. Vaughn & Taylor Construction Co., Inc., 2103 North Grant, Odessa, Texas. Phone 7-2091.

FOR SALE: U-15 rotary rig like new, including trailer house fully equipped. Wonderful buy. Available only because of health. Now drilling in West Texas. Inspect while in operation to get better idea. H. W. Sullivan, 611 Gulf States Bldg., Dallas 1, Tex.

WATER FLOOD EQUIPMENT for Sale in East Kansas; One 100 H.P. Waukesha engine, $500.00; One 40 H.P. Bovaird-Seyfang gas engine with cutoff coupling clutch, $350.00; Two 3 x 8 Worthington pumps, $200.00 each. For further information contact D. K. Auld, Deep Rock Oil Corporation, Garnett, Kansas, or Joe A. Huitt, Tulsa.

Gase Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

Used Seamless
STEEL TUBING

Ideal for gas, water and air lines

2¼" O.D.
3¼" O.D.
3½" O.D.
4" O.D.
5⅜" O.D.
5½" O.D.

Approximately 5 miles of each diameter available in single or double random lengths with beveled ends.

Write — Wire — Phone

SONKEN-GALAMBA CORPORATION
2nd and Riverview (X-982)
Kansas City 18, Kansas
ATwater 9305

EQUIPMENT FOR SALE

WILSON Giant Drawworks equipped make and break cathead. 2 P.C. 1879 Buda Engines. All this equipment in A-1 condition. Priced right to sell. Box G-711, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 10,000'—4½" drill pipe, with tool joints cut off, located at Hobbs, New Mexico. Makin Drilling Company, Box 1628, Hobbs, New Mexico.

SALES and rentals of cable drilling and fishing tools, casing and equipment, from the Southwest's largest stock of used cable tools and oil field supplies. Degen Pipe and Supply Co., Tulsa, Oklahoma.

REPRESSURING plant with Ingersoll-Rand compressor 4¼ X 10 and 10 X 10 Imperial type XOB10, 50 HP 2 cycle Superior engine, circulating pump, 2 200 bbl. cypress tanks, orifice flanges, scrubbers, building. Complete in every respect with lots of new spare parts. Write or call R. A. Putman, phone 2-6663, City National Bldg., Wichita Falls, Texas.

FOR SALE

New and Used material—Immediate delivery from stock, Angles, Channels, I and WF Beams, especially for construction needs.

H BEAMS PILE SECTIONS

Phone or Wire your steel requirements.

We are also interested in purchasing your surplus material. We assure you our prices will be the best obtainable.

CARSAND STEEL CORP.
14-23 34th Avenue
Astoria, New York
Astoria 8-4484 8-8023

BARON TUBE CO.
722 OLIVER ST., N. W.
ATLANTA, GA.

A SURE SOURCE OF SUPPLY AT ALL MARKET LEVELS FOR CASING, TUBING AND LINE PIPE. INQUIRIES SOLICITED.

EQUIPMENT FOR SALE

EVERYTHING in new and used equipment for well drilling. Fishing tools rented. Save money, get quotations from Pressey & Son, Pueblo, Colorado.

NEW 145GKU Waukesha Engine used less than 90 days. Perfect condition. Delivered cost $3,500.00, sell for $2,850.00. Reed Drilling Co., Inc., Philtower Bldg., Tulsa, Okla. Phone 2-9638.

7—8000 GAL. R.R. TANK CAR tanks with heating coils in New Jersey $685 each. Lestan Corp., Rosemont, Pa.

FOR SALE
Equipment for Complete Pipe Shop

1—Bignall & Keeler 6 B Threading Machine. Landis Heads 1¼" to 6".

1—Bignall & Keeler #12 Threading Machine. 4" to 14".

1—McFarland Portable Pipe Testing Machine Mounted on Tandem Wheel Trailer.

1—Ingersoll-Rand 3 Cylinder Air Compressor W/15 HP Motor.

1—Master Deluxe Pipe Cleaning Machine W/Wisconsin Engine.

1—Model D-8 Hydraulic Pipe Straightener—100 Ton—W/Wisconsin Engine.

1—Malsbury Automatic Steam Cleaner. Portable.

1—G E Electric Welder W/25 AP Acetylene Generator and HOM #1 Beveling Machine (4" to 6") and HOM #2 Beveling Machine (8" to 12"). All Mounted on 2 Wheel Trailer.

Complete set of motors, cutters, hose, etc., for cleaning inside of 1" to 6⅝" ID Pipe.

1—#502 Oster Pipe Threading Machine W/¼" to 2" Dies.

Tool Cabinets, Chain Hoists & Trolleys.

This Equipment Purchased New. Used Less Than 1 Yr.

40% OFF NEW COST

Write, Wire or Call

JOHN B. HOWELL or L. E. FRENCH
Shreveport, Louisiana
P. O. Box 592 Phone 4-2601

60,000' 3½" OD weight 6.50 TC electric weld and seamless, new.
45,000' 4½" OD weight 9.50 T & C electric weld and seamless, new.
10,000' 2⅜" OD J-55 weight 4.70 upset tubing, new.
40,000' 6⅝" OD weight 18.97 seamless Range 2 used 4 years product line, beveled for welding guaranteed A-1.

All above priced to sell. Cash or terms.

P. O. Box 1858 **W. C. BERRY** **Phone 3-6141. Tulsa, Okla.**

EQUIPMENT FOR SALE

FOR SALE: Type 80 Cooper gas compressors. Good condition. Alfred B. Kern, 223 Wright Building, Tulsa, Oklahoma.

FOR SALE

SUPERIOR HEAVY DUTY DIESEL
510 hp. at 360 r.p.m.—5 cylinder—14½x18 type ZDSB — non-reversing — vertical—4 cycle—cold starting—mechanical injection. Engine is totally enclosed. Complete with a 48" 7 groove V-belt sheave and new spare parts. For heavy duty pumping, dredge service, power generation, textile and saw mills, mining, etc. EXCELLENT CONDITION, IMMEDIATE DELIVERY.

G. M. 3-71 DIESEL GEN. SET
30 kw. 2 cylinder 4½x5 diesel—radiator cooled—electric starting. Delco 3/60/440 generator — with switchgear. Skid mounted. Portable.

30 KW SHEPPARD DIESEL SETS
30 kw. Sheppard—115 volts DC—radiator cooled . Built 1950. Excellent condition. Self-mounted radiator and fuel tank. 16 units available.

60 KW CUMMINS DIESEL GEN. SET
120/240 volts D.C.—3 wire. Engine: 6 cyl. model H—heat exchanger cooled.

60 KW G.M. 6-71 DIESEL GEN. SET
Engine: G.M. 6-71 4½x5—6 cyl.—heat exchanger cooled. Generator: Star Electric—120 volts D.C.—500 amps.

75 KW WAUKESHA DIESEL GEN. SET
Totally enclosed. Engine: Waukesha diesel 6¼x6½—160 H.P. @ 1200 R.P.M. Generator: G. E. 75 kw. 230 volts D.C.—231 amps.—full load 300 volts.

100 KW G. M. 3-268A A.C. DIESEL GENERATOR SETS
440 volts—3 phase—60 cycle. 20 kw. D.C. generator on same shaft—5 kw. exciter—120 volts D.C.—electric starting.

300 KW G. M. D.C. DIESEL SET
ENGINE: G.M. 8-268A—6½x7—1200 r.p.m.—air starting. GENERATOR: 300 kw G.E.—120/240 volts D.C.—3 wire—totally enclosed—Marine type BB—with switchgear.

STEAM TURBO-GENERATOR SETS
300 kw—120/240 volts D.C.—1200 r.p.m.—1250 amps.—turbine W.P., 225 lbs. to 440 lbs.

ENGINES SUITABLE FOR CONVERSION TO NATURAL GAS
(5) New STERLING marine gasoline engines. 900 H.P. @ 2100 RPM; 1200 H.P. @ 2800 RPM. 6⅜x6½—electric starting.
(9) HALL-SCOTT DEFENDER gasoline engines. V-type 12 cyl.—600 H.P. @ 2100 RPM—5¾x7—electric starting.

WINCHES SUITABLE FOR DRILLING RIGS
Hunt Tool Co.—double drum double gypsy. 50 H.P. 230 volt D.C. motor and hand brake. Complete with controls. Condition equal to new. 20 units available.

LARGE DRILLING RIG MOTORS
(4) 1375 H.P. @ 1300 RPM—415 volts D.C. Can be used as 700 RPM 230 volt D.C. motors @ 600 RPM. G. E.—Ex. Cond.

MARINE SURFACE CONDENSERS
1050 sq. ft.—3000 sq. ft.

THE BOSTON METALS CO.
313 E. BALTIMORE ST.
BALTIMORE 2, MARYLAND
CURTIS 7-5050

EQUIPMENT FOR SALE

OIL FIELD EQUIPMENT
18,000 ft., 4½-in. casing, 11 lb., 85 cents; 25,000 ft., 2-in. tubing, 24 cents; 1,100 ft., 7-in. casing, $1.25; 25,000 ft., ⅝-in. rods, 12½ cents. 6D Jensen jack, $450. Bethlehem jack, $675. National jack, $500. Oilwell jack, $550. 5 hp. motors and controls, $175 ea. Miscellaneous fittings, 2-in. lead line; 100, 250, and 312-bbl. tanks. All equipment nearly new. Floyd Hubbard, Virgil, Kansas.

FOR SALE: 4598 feet of 7⅝ inch O. D. Pipe, 26.4 lb., 8 thread, J-55 B Grade, run once, located at Roundup, Montana. Box G-717, The Oil and Gas Journal, Tulsa, Oklahoma.

90 H.P. 2 CYCLE Superior Direct Driven Compressor Unit with 5½" high and 11" low pressure Cylinders, with Novo Air starting unit and steel house. Suitable for pulling vacuum and recycling gas. Near Pawhuska, Okla. Earl Davis, P.O. Box 7005, Tulsa 18, Okla.

FAILING MODEL 1500—on contract with major client in Montana. Write for details to Box G-703, The Oil and Gas Journal, Tulsa, Oklahoma.

2—Model 19 ELI 24 trace seismograph instruments, with ELI RO-10 Camera, mounted on 1½-ton Ford truck with twin power reels and cables. In operating condition. Priced to sell, only $5,000.00 each. Dayton Exploration Company, 600 East 4th, Tulsa, Oklahoma, Phone 3-6845.

FOR SALE at Okla. City whse., 1 used 8" x 3¼" x 8" Ingersoll-Rand type 20 high pressure, 2 stage portable compressor. Serial #PP71898 driven by model GU2S 5¾" x 6¼" Waukesha engine Serial #76426 mounted on steel wheels. Price $1500.00. Cities Service Oil Co., Patridge, Bartlesville, Oklahoma.

BIG BARGAIN FOR SALE
NEW COUPLINGS

Victaulic, Gruvagrip 4" & 6" Complete. Purchasing at least 2,000 pcs., you pay only the factory price of the gasket.

Box G-720
The Oil and Gas Journal
Tulsa, Oklahoma

8" SEAMLESS LINE PIPE

6500 ft.—8⅝" O.D., 28.55# Grade A Seamless, 40' DRL, ends beveled. Used, excellent like new condition. Priced attractively, immediate delivery, Wilmington, Illinois.

HUMBOLDT-CHICAGO PIPE LINE PROJECT
Tulsa, Okla. Phones 2-9128, 3-5400

USED EXCELLENT CONDITION IN OPERATION
One Each (4¾" to 1") (8⅝" to 2⅜") (13⅜" to 4½") LANDIS Leadscrew Receding Head Pipe Threading and Cutting Machine Motor Driven.

OILFIELD SALVAGE CO., INC.
Phone CHarter 6914
P. O. Box 2589 Houston

FOR SALE
POWER CYLINDER HEADS

for Worthington Compressor Type LTC and Clark Bros., RA Series
Price $95 each

REFINERY MATERIALS COMPANY
P.O. Box 14306 Houston 21, Texas

EQUIPMENT FOR SALE

WILSON GIANT RIG, 500 Transmission, 2 L.I. 600 Cummins Diesel Engines Compounded, 7¼ X 14 Pump, 95' Hispeed Lee C. Moore Mast, Drill Pipe nearly new. Complete ready to run. Price $57,500.00. Box G-700, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1951 Cessna 195; 245 HP; 400 total hours; Cross-wind Gear; VHF; OMNI, Gyros; Hangared; Brand new condition; one owner; $10,000.00; write Box G-582, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE—5000' of 4½" OD drill pipe with Hughes tool joints. Good condition for medium drilling. Located near Abilene, Tex. Subject to inspection. WELSH, 609 Gulf States Bldg., Dallas, Tex. PR-5668.

JOY 300 Drilling Rig, butane powered, mounted on Brockaway 6x6 truck, 3500 feet 3½ inch drill pipe. Auxiliary mud pump and butane engine as separate unit. All tools and equipment included. This rig in first-class working condition and ready to go to work immediately. Call or write Steele Brothers, Crete, Nebraska. Phone 127.

WANT EQUIPMENT: Did you find the equipment you wish to purchase in this column? If not, use an "Equipment Wanted" classified advertisement to find it. It is available somewhere and Journal classified advertisements will find it. See box heading for classified rates, or write The Oil and Gas Journal.

EQUIPMENT WANTED

WILL PAY highest prices for used casing, used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

NOTICE: We buy. We sell equipment everywhere. If you want to sell or buy, contact Pressey & Son, Pueblo, Colorado.

WANTED soon used natural gasoline plant to extract natural gasoline, butane and propane to handle 4 to 8 million C.F. daily wet gas. Goodalls, Ogallala, Nebr.

WANTED, USED EQUIPMENT, one oil well cementing pump with or without truck. Write W. L. Blakely, Jelloway Place, Danville, Ohio.

WILL TRADE at Aspermont, Texas, 25,000' or less of 2⅞" upset J-55 seamless tubing for 2⅜". Joe A. Huitt, Deep Rock Oil Corp., Tulsa.

EQUIPMENT NOT IN USE: Did you find a buyer in this column for the equipment you have for sale. Someone wants it and an "Equipment For Sale" classified advertisement in the Journal will find a buyer. See box heading for classified rates or write The Oil and Gas Journal.

HELP WANTED

FOREIGN EMPLOYMENT. List of oil companies and drilling contractors showing where to apply for foreign jobs. OIML Co., Box 2603, Tulsa, Okla. $5.00 cash.

SEISMIC SUPERVISOR required by expanding and aggressive seismic contracting company. Should have ability to supervise any domestic area and have good professional contacts. Minimum requirements; college degree in geophysics or related fields and eight years' seismic experience. Good future. Tulsa location. Box G-705, The Oil and Gas Journal, Tulsa, Oklahoma.

TWO 55,000 BARREL TANKS

One with steel Cone Roof, 114'-6" diameter by 30' high. Riveted construction. Located Centralia, Mo.

One with Steel Floating Roof, 114'-6" diameter by 32'-6" high. Riveted construction. Located Wellsville, Mo.

WILL SELL AS IS OR WILL DISMANTLE FOR RE-ERECTION

BROWN-STRAUSS CORP.
1546 Guinotte — Phone HA. 1000 — Kansas City, Mo.

PETROLEUM ENGINEERS

Major Oil Company in Venezuela has openings for Graduate Petroleum Engineers with 1 to 3 yrs. Production experience; to conduct Engineering Studies on Production Methods, Procedures, & Special Projects.

Also having openings for Petroleum, Mechanical & Chemical Engineers for work in Production, Drilling & Gas Departments.

P. O. BOX #35
Bowling Green Station
New York 4, New York

HELP WANTED

CHEMIST to take charge of large independent oil company laboratory located in Great Lakes area. All applications strictly confidential. Experience required in laboratory administration. Give full details of education and experience. Reply to Box G-687, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES REPRESENTATIVES WANTED: Manufacturer of Test Separators, Well Testers, Metering Separators, Oil and Gas Separators, Free Water Knockouts (Crude Oil and Natural Gas), Emulsion Treaters, Water Filters, Gas Scrubbers, and related equipment wants Commission Sales Representatives for following territories: (1) Oklahoma, (2) Kansas, (3) Tri-State Area (Illinois, Indiana, and Kentucky), (4) West Texas, (5) North Texas, (6) East Texas, (7) South Texas, (8) Rocky Mountain, (9) Williston Basin, (10) California, (11) Canada, and (12) Mexico. Please give details concerning present Sales Coverage and Personnel when answering. All replies confidential. Box G-701, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEERS

FOREIGN SERVICE

Graduate engineers with good background in general physics, mathematics, mechanics and with some laboratory experience in equipment and techniques. For laboratory position responsible for theoretical experimental studies on reservoir fluid and rocks. Duties will consist of designing equipment, performing or supervising, testing and analyzing and reporting results. Studies pertinent to evaluation of primary depletion practices and applicability of secondary recovery for pressure maintenance operation will be required.

Please write giving full particulars regarding personal history and work experience. Please include telephone number.

RECRUITING SUPERVISOR
Box OG-5
Arabian-American Oil Company
505 Park Avenue
New York 22, N. Y.

OIL Industry Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5974. Tom Robinson, owner. For Technical and Trained Personnel, including LPG.

NEED sales representation by organized sales group or established individuals seeking additional line. Area to be covered: Kansas and Oklahoma. Contacts with production engineers, supts., and depts. of extreme value. Write to Rm. 204, 116 N.W. 2nd., Oklahoma City, Oklahoma.

WANTED FOR EMPLOYMENT: Petroleum Engineer or Geologist with two or three years' experience in Louisina Gulf Coast. Duties will entail preparation and maintenance of detailed structure and isopach maps of south Louisina fields and evaluations necessary in field studies. Work located in New Orleans with reliable and financially strong concern. Reply giving age, experience in detail and salary desired. Inquiries will be kept strictly confidential. Our employes know of this ad. Box G-713, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST: Wanted experienced SEISMIC SUPERVISOR for location in Rocky Mountains. Must have degree in related subject with at least 8 years' experience. In reply please give complete experience and education. Replies confidential. Box G-714, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

OVERSEAS. Contracting, Engineering and Oil firms; big pay, no U.S. taxes, cheap living costs. Send $1 for list 100 names where to apply. Foreign jobs, Box 166, Washington 4, D. C.

THE POSITION YOU WANT: Oil industry companies are looking for men to fill every conceivable kind of position. If you didn't find the position in this column that you are looking for, use a "Situation Wanted" classified advertisement to state your qualifications. Some company is probably looking for your ability. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

DUTCH GEOLOGIST, M.S. degree, desires position in States. Six years experience subsurface and field work, mainly Indonesia wth Standard-Vacuum. Seven months experience in States. 2107 Dublin Road, Oklahoma City. TRinity 8-3666.

OIL COMPANY ACCOUNTANT, Secretary, Office Mgr.—Full Charge—Age 41, 21½ yrs. Corporation, Partnership, Individual and Estate experience. Miss Opal Wolf, WI-5194, 3324 Parkridge, Fort Worth, Texas.

LATIN AMERICAN EXPERIENCE, 15 years, government ministries, geology, concessions, drilling. Graduate engineer with over-all executive experience on pioneer exploration programs for oil. Box G-710, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, B.S., 28, married, 26 months oil field experience, desires job anywhere in U. S. Write Box 1751, Hobbs, New Mexico.

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628, Ph. No. 3-3141, Hobbs, New Mexico.

GEOLOGIST, Mining-Petroleum. Experienced in: surface and subsurface mapping, exploration, writing reports, surveying, drilling. Colorado Plateau experience. Box G-708, The Oil and Gas Journal, Tulsa, Oklahoma.

CORROSION METALLURGIST. Capable effecting outstanding savings for large petroleum company in process equipment, engineering materials, protective coatings selection. Will travel. Personable. Employed, registered engineer. Experienced technical sales, research, welding, ferrous, non-ferrous metals, protective coatings. Box G-712, The Oil and Gas Journal, Tulsa, Oklahoma.

CHEMICAL PROCESS ENGINEER, age 40, well grounded in fundamentals of compression, absorption, fractionation, plant operation, and products quality control, who feels that he is in a rut, will accept decreased salary to gain challenging responsibility with a progressive organization. Box G-716, The Oil and Gas Journal, Tulsa, Oklahoma.

MATERIAL MAN: 15 years' office and field experience Oil Production Companies, Material Accounting, Pricing, physical inventories, perpetual inventory records, transfers, purchasing, partnership billing, etc. Best references. Reply Box G-715, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER, 26, married, six years' varied experience, three years field engineer. Presently employed with major in South Louisiana. Desire aggressive independent or possible sales. Must offer opportunity and responsibility. Box G-718, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST experienced Kansas leasing, geology, drilling, desires connection with independent oil company or group desiring representation in Kansas. Lease and subsurface data currently maintained. Box G-709, The Oil and Gas Journal, Tulsa, Oklahoma.

THE RIGHT MAN: Can you fill the position you have open from the qualifications listed in this column. Men are always looking for an opportunity to improve themselves. Use a "Help Wanted" Journal classified advertisement to find the men you need. See box heading for classified rates or write The Oil and Gas Journal.

SITUATIONS WANTED

GEOLOGIST: Six years with major company on Gulf Coast. Also some knowledge Mid-Continent. Excellent experience various phases exploration and evaluation. Young, intelligent, aggressive. Desires affiliation with Independent in Texas or Denver. Box G-719, The Oil and Gas Journal, Tulsa, Oklahoma.

ROYALTIES

WORLD'S LARGEST REGION for oil and gas condensate reserves and expectant oil fields, inquire for opportunities therein. A. S. Berry, P. O. Box 1383, Tulsa, Oklahoma.

GET TOGETHER: Both Capital and Royalties are available. If the investment proposition you want isn't listed in this column, use a Journal classified advertisement to find it. See box heading for classified rates, or write The Oil and Gas Journal.

LEASE AND DRILLING BLOCKS

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

160-ACRE LEASE available central Okla. for drilling, no way condemned, flowing well adjoining farm, 3 oil sands in area. Approx. 6600, 7200 and 7600 feet. Some wells reported more than 1000 barrels. If you are regularly engaged in the oil business and interested, write Land Owner, Box 572, Chickasha, Okla.

TWO LOTS north outskirts Snyder; two north outskirts Okla. City; one each Stanton, Lott, Quanah, Texas. Want drilling. W. A. Epps, Pioneer Hotel, Tucson, Arizona.

DRILLING DEAL: 90 acres, Chanute, Kansas, area, Sandfrack. Must drill immediately. Box 35, Iola, Kansas.

SEE A. L. Bowles, Rollow Building, Ada, Oklahoma, for drilling deals.

18 BARRELS DAILY production—shallow field, Eastern Kansas. Phone 4-1213 or write V. E. Sheffer, 500 Petroleum Bldg., Wichita, Kansas.

WYOMING-GREEN RIVER Basin-Middle Mountain Area. Small, very choice fee lease (280) acres close to well producing 6,000,000 cu. ft. sweet gas and 165 bbl. of 41°-gr. oil per day. Approximately 6000 ft. or less will test four (4) possible pay horizons. Gas pipe line connection nearby. No bonus required. Will gamble on override or oil payments. Have a well-known, reliable Texas drilling contractor who will take a 25% interest in this venture and assume operating responsibility. Approximately $65,000.00 needed to purchase other 75% drilling interest. Cost of subsequent development wells should be much less. A. E. Mills, Phone 130, Glenrock, Wyo. P. O. Box 105, Casper, Wyo.

PUBLIC SALE OF OIL LEASEHOLDS

The undivided oil and mineral leasehold interest of Paul Bussler, lately deceased, in 20,000 acres in Madison County, Tennessee, will be offered at public sale, for cash, at 12:00 Noon, November 9, 1953, at the Court House in Jackson, Madison County, Tennessee. Sale is subject to confirmation by Judge of County Court. Inquire: Second National Bank of Jackson, Tennessee, Administrator.

FOR SALE: Ten eighty-acre leases Teton County, Wyoming. Deep test now drilling on similar structure eight miles to northwest. 3417 Bellaire South, Fort Worth, Tex.

LOOKING FOR A LEASE? There will be over 40,000 wells drilled this year. If you are looking for a lease, drilling block, or drilling deal and haven't found it in this column, or if you have a lease or drilling block you want drilled, a Journal classified advertisement can find an interested party. See box heading for classified rates, or write The Oil and Gas Journal.

LEASES ROYALTIES
Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited
B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

FINANCING

CAN use oil production or producing royalties, overrides, etc. Any size deal, and about any location. Box 194, Longmont, Colorado.

AN AGGRESSIVE, successful, Mid-Continent oil producer desires financing adequate to support additional exploration activities. This is a chance to do business with one of the most aggressive new companies in the field. Box G-689, The Oil and Gas Journal, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

LINES WANTED by manufacturers agent. Extensive contacts in the Oil Industries. Aggressive, experienced sales engineers traveling Mid-Continent area. Warehousing space available. Box G-707, The Oil and Gas Journal, Tulsa, Oklahoma.

MAILING LISTS

MAILING LISTS of the oil industry. Our 30th year. Send for catalogue. Oil Industry Mailing List Co., 405 Tuloma Bldg., Tulsa, Okla.

REAL ESTATE FOR SALE

SPACE IS NEEDED: A Journal display classified advertisement is the quickest way to rent or sell your real estate. In the present period of expansion oil industry firms urgently need the space you have available. If it isn't listed here, you may also find it by stating your needs in these pages. For classified rates see box heading or write The Oil and Gas Journal.

ELECTRICAL CONTRACTORS

Office Phone 5-5315 — Res. Phone 7-4950

W. L. RATCLIFF COMPANY
ELECTRICAL CONTRACTORS
Industrial—Commercial—Distribution
W. L. Ratcliff — 508 Caddo St.
P. O. Box 373 — Shreveport, La.

FOR SALE—PUBLICATIONS

OIL AND GAS LAW—TEXAS

A compilation of eight lectures on Texas Oil & Gas Law by outstanding attorneys, landmen and brokers to professional oil men in the Permian Basin.

PRACTICAL—USEFUL—CONCISE

Basic information on ownership of lands, leasing, sale of minerals and royalty, written in layman's language.

Includes OIL & GAS LEASES AND ESTATES, EXECUTION OF LEASES AND ASSIGNMENTS, TITLE EXAMINATION, THE LANDMAN'S FUNCTION and other titles.

BOOK FORM $5.00. Send check to
W. C. MONTGOMERY
Dept. "A," P.O. Box 2503, Midland, Tex.

AERIAL PHOTOGRAPHY

GOVERNMENT AERIAL PHOTOGRAPHY for exploration, etc.

Our integrated services of personal search reporting, prepaid orders, and delivery follow-up often save you a month's costly delay in difficult, unsatisfactory correspondence with numerous gov't agencies on procurement of inexpensive stereo prints, mosaics, etc. U.S. air coverage divided among various agencies each operating separately. Fees quoted on your job based on work required. Original gov't. prepayment receipts furnished, prints shipped direct. Searches for ready-made foreign air photographs also made. Write Dept. OGJ.

WASHINGTON COMMERCIAL CO.
1200 15th St. N.W., Washington 5, D.C.

LEGAL

Sealed bids will be received at the office of the Area Director, Bureau of Indian Affairs, Room 305, Federal Building, Albuquerque, New Mexico, until 2:00 o'clock, P.M. (MST), October 15, 1953, and then publicly opened for sale of oil and gas leases on 26 tracts of Jicarilla Tribal Indian lands totaling 65,745 acres, more or less, located in the Rio Arriba and Sandoval Counties of New Mexico on the Jicarilla Indian Reservation. Each tract containing four sections each, is offered for lease separately. For complete description of the land, location, provisions and stipulations of the leases to be sold, address the Superintendent Jicarilla Indian Agency, Dulce, New Mexico.

Equipment Men
. . . in the News

Magcobar Appoints Five New District Managers

Appointment of a number of new district managers has been announced by Magnet Cove Barium Corp.

Roy C. Stringfellow is new manager of the Shreveport district. He was formerly a field service engineer for Magcobar in the Shreveport area. He attended Centenary College.

New manager of the Regina, Sask., district is Harold A. Fogarty, who was a field service engineer in Regina before his present appointment. Fogarty attended University of Oklahoma.

James E. Carlton will manage the Laurel, Miss., district. A graduate of Texas A. & M., he was previously a field service engineer at Goliad, Tex.

Thomas L. Cox has been named to manage the northern Oklahoma district with headquarters at Enid. Formerly a field service engineer in Enid, he is a graduate of Oklahoma City University.

The southern Oklahoma district will be managed by Cleron L. Henderson. His headquarters will be in Ardmore where he was formerly a field engineer. He is a graduate of Oklahoma A. & M.

Guiberson Gives Breedlove Venezuelan Assignment

BREEDLOVE

Mitchell W. Breedlove, sales and service representative for The Guiberson Corp., has been given a special assignment in Venezuela, according to an announcement by Harry S. Zane, Jr., sales manager of Guiberson. With temporary headquarters in Caracas, Breedlove will offer technical advice and assistance to drillers and producers on the use and applications of Guiberson oil-field equipment.

Breedlove has extensive first-hand knowledge of this equipment, having been with Guiberson since 1936 in various capacities as machinist, engineer, and sales and service representative.

Zane plans a personal tour of Venezuela and other South American oil-producing areas in the near future.

Export representatives for Guiberson are Beckley, Haltom & Hickman, of New York City.

MacKenna Named Tulsa Manager for Worthington

L. J. MacKENNA

L. J. MacKenna has been appointed district office manager of Worthington Corp.'s Tulsa office, according to an announcement by T. J. Kehane, assistant vice president and general manager.

MacKenna joined Worthington in July 1926 following his graduation from Northeastern University. His first assignment was at the company's former Blake and Knowles plant at East Cambridge, Mass., as an engineer. In 1927 he moved to the Harrison, N. J. office as an application engineer, and in 1930 he transferred to the Detroit district office as sales engineer. After 2½ years at Detroit, MacKenna moved to the New York office as general line salesman.

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LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D.C. Notice is hereby given that approximately 40 acres of acquired land comprising the $W\frac{1}{2}SE\frac{1}{4}SW\frac{1}{4}$ and $E\frac{1}{2}SW\frac{1}{4}SE\frac{1}{4}$ sec. 18, T. 11 N., R. 15 W., Mich. M., within the known geologic structure of the Cedar Creek field, undefined, Muskegon County, Michigan, will be offered in one parcel for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre at 1 p.m. E.S.T., October 28, 1953, when bids will be opened. Details of the lease offering and how and where to submit bids may be obtained upon request from this office. L. E. Hoffman, Chief, Division of Minerals.

LEGAL

28,263.27 acres of Tribal Indian lands and 4,484.63 acres of Allotted Indian lands located on the Uintah and Ouray Indian Reservation, Townships 1 and 2 North, Ranges 1 East and 1 West, Uintah Special Base and Meridian Survey, Uintah and Duchesne Counties, State of Utah, are being advertised for oil and gas lease sale, bids on which will be opened 2:00 P. M., October 14, 1953, at the Uintah and Ouray Agency, Harry W. Gilmore, Superintendent, Fort Duchesne, Utah. Full particulars may be obtained from the office of the Regional Oil and Gas Supervisor, U. S. Geological Survey, Casper, Wyoming, or from the Uintah and Ouray Agency.

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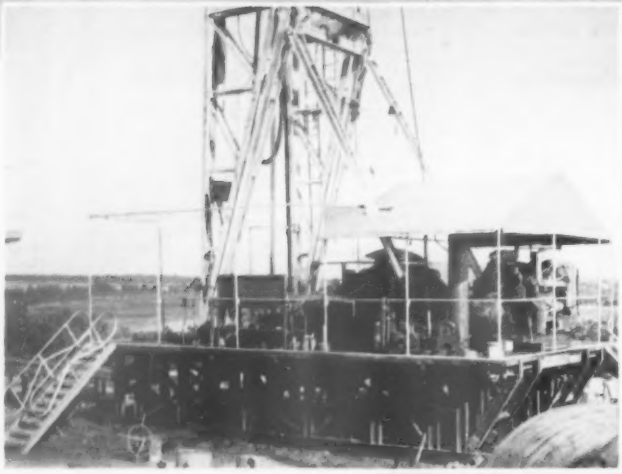

CIMARRON DRILLING COMPANY—IDECO equipment includes H-35-S draw-works unit with Twin-Disc torque converter, powered by IDECO-WAUKESHA twin 145-GKBU power unit rated at 262-298 gross horsepower; UTB-160 "Shorty" traveling block and hook; SS-150 swivel and SHS-175 rotary. The D-300 Emsco 7½" x 14" mud pump is powered by 6LRO Waukesha engine through U-14 Unit Rig drive. Mast is 126' high Lee C. Moore with 8' substructure. Rig is protected by 10¾"-6000# Shaffer manually operated double gate. Drill pipe is 4½" x 16.60# IUE with full hole tool joints.

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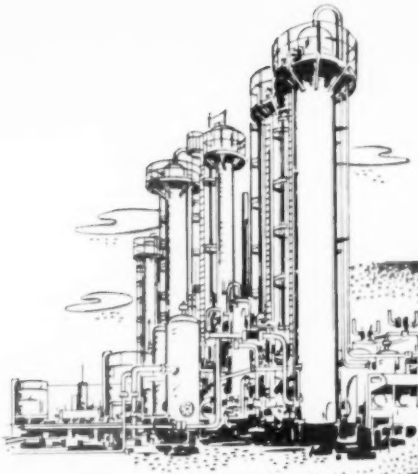

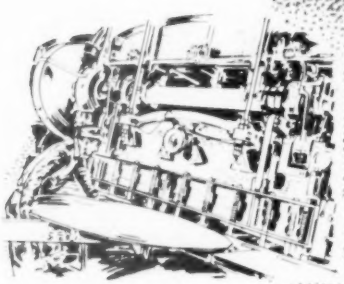

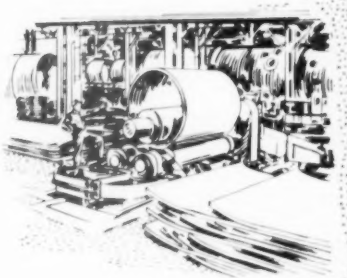

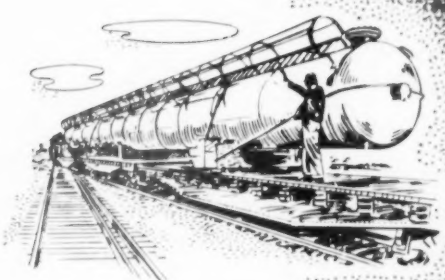

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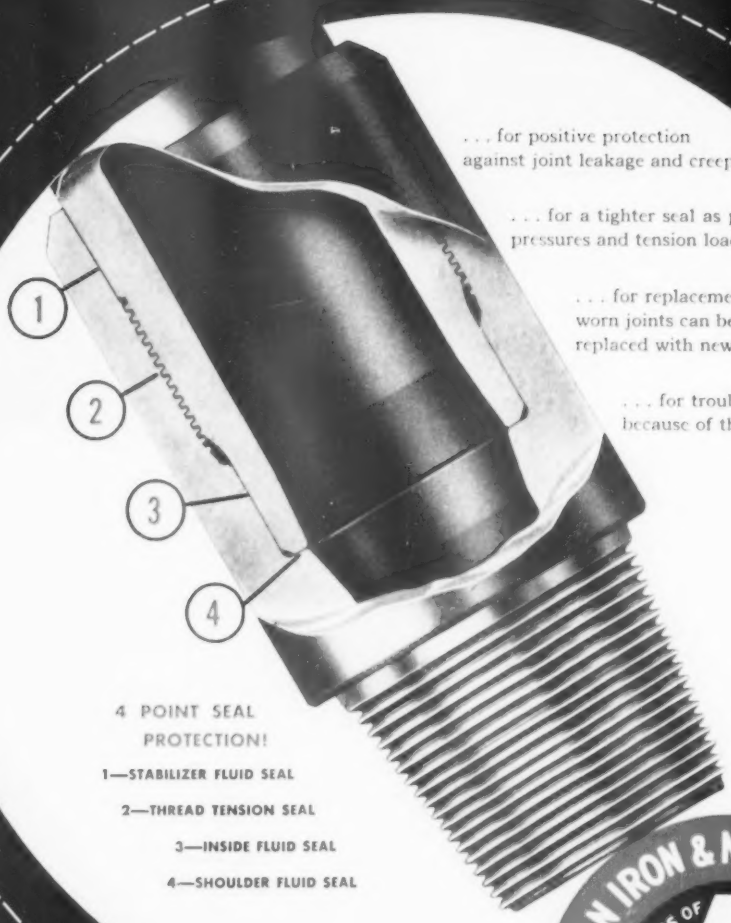

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